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CONSULTING

E-TRIP Technical Assessment & Planning

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Document Information

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<tr><td>Purpose</td><td>The purpose of this document is to provide an assessment of the readiness of Washington justice and traffic records agencies to implement electronic traffic records exchanges statewide. It also makes recommendations on exchange architecture, JIN standards, and proposed implementation schedules.</td></tr>
<tr><td>Audience</td><td>The primary audience for this document is the Project Sponsors and other stakeholders at the Administrative Office of the Courts (AOC).</td></tr>
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Document Revision History

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2 Introduction

Each year, over one million tickets[1] are written for traffic and vehicle infractions in the State of Washington. Additionally, nearly 150,000 vehicle collisions reports and other forms are created by State and Local Law Enforcement officers as a part of their patrol assignments. Currently, all of these forms are created by hand, and entered into various computer systems around the state, some as many as four separate times. This manual process is prone to errors, time consuming, and very costly to taxpayers.

Stakeholders in this process have long envisioned a process where this data can be entered once and automatically be processed from the officer's patrol car, to their local or regional processing center, through the state court system and eventually archived in one of several state data repositories, all without ever having to re-enter the data. The end goal of this initiative is to speed processing, eliminate data entry errors, and minimize the manual effort processing information gathering forms by:

1. Automating data transfers between various information consuming agencies, and
2. Providing timely processing of pertinent and permitted information between data aggregating and consuming agencies.

The Administrative Office of the Courts has asked for an assessment of the potential costs associated with implementing extensible, scalable judicial information exchange architecture. The assessment should be based on current operational readiness, a proposed architecture, cost of potential hardware and cost of effort for agencies to achieve readiness to implement the proposed solution.

The following have been identified as issues to address in this project:

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[1] Discussions surrounding the E-TRIP project included numerous references to a "Citation", "Ticket", and "Notice of Infraction" somewhat interchangeably. Accurately stated, "Citation"is a term used by the Washington Rules of Court to describe a charging document for criminal cases and a "Notice of Infraction" is the document used for non-criminal infractions. In using the generic term "Ticket" in this document, we are referring to both.

- Identify the interacting agencies and what information is shared between them
- Describe a standards-based technical solution, which meets functional and non-functional requirements, and allows for (partially) automated exchange of pertinent information between agencies
- Describe a flexible technical solution allowing different implementation approaches, and range of implementation costs based on the agencies' needs and priorities
- Make the standards-based technical solution extensible for future information exchange needs
- Identify the current operational readiness for each participating Agency to conform to the proposed technical solution
- Estimate the costs associated with the range of technical implementation options
- Estimate the effort needed to implement the proposed technological solution

3 Scope

This project began with a baseline assumption that the functionality to be elaborated had been previously identified in the E-Citations Technical Architecture (ETA) project completed in December, 2003. The ETA project was, however, conducted from a low level data flow perspective that mirrored the operational characteristics of the TraCS data entry system. Additionally, in the previous report only the ticket document was considered in scope and analyzed in detail. The report identified and footnoted the presence and need for both the Collision and DUI Sworn Reports but did not detail those document exchanges.

The approach we took in this report was to gather the requirements of all the potential stakeholders in the Washington traffic records ecosystem and to construct the high level architecture in a way that included all of the primary exchanges for all of those stakeholders. Just prior to beginning this project the Traffic Records Committee changed the name of the initiative to E-TRIP (Electronic Traffic Records Information Project) from E-Citations reflecting the expanded scope of the initiative as well.

The following two sections list those components of E-TRIP that were considered in-scope and therefore were analyzed as a part of this report. Those items not in scope were typically secondary exchanges that were discovered during the course of the project, and had no material bearing on the recommendations and conclusions within this report.

3.1 Components in scope

The following components were in the scope of this report's analysis:

- **Ticket Filing (Law Enforcement – Courts)**
- **Person Information (Courts – Department of Licensing)**
- **Ticket Disposition Reporting (Courts – Department of Licensing)**
- **Collision Reports (Law Enforcement – Department of Transportation)**

3.2 Components out of Scope

The following items were considered out of scope for this project and were therefore not considered in detail as a part of this engagement:

- **Law Enforcement mobile data entry hardware/software requirements –** The assumption was made at the start of the project, not to perform any analysis on the various data entry devices available to law enforcement. AOC and Washington State Patrol are currently evaluating various options in parallel, and it is an objective of the E-TRIP design to be accommodative of any device or system that can deliver the XML standard documents envisioned for each exchange.
- **Exchanges –** The following exchanges were identified as a part of this effort, but were not considered to be a primary functional requirement of E-TRIP.

Out of Scope Exchanges			
Originating Partner	**Responding Partner**	**Codesic Internal Use Case Description**	**Summary/Comments**
AOC	DOL	NotificationOfDelinquentParkingTickets	Past due parking tickets trigger inability to renew vehicle registration
AOC	DOL	ReportFailureToAppear	Failure to appear notice triggers administrative suspension of driving privilege.
AOC	DOL	RequestVehicleInformation	Request respond exchange to retrieve vehicle information based on plate, VIN or perhaps DL#.
AOC	LEA	ReportDismissedTicket	Notification back to LEA that ticket was dismissed by Court.
LEA	AOC	FileParkingTicket	Filing parking Tickets into DISCIS
LEA	Jail Prosecutor	FileBookingReport	Jail intake form stemming from an arrest
LEA	Impound Facility	FileImpoundReport	Report used to authorize impounding a vehicle.
LEA	State Toxicology Lab	FileDUIBloodRequest	Request Toxicology screen on blood sample.
LEA	DOL	FileCollisionReport	Raw intake of a WSDOT collision report sent directly to DOL concurrently with delivery to WSDOT.
LEA	DOL	FileDuiReport	Sworn DUI reports received from Law Enforcement along with supporting documentation

Out of Scope Exchanges			
Originating Partner	**Responding Partner**	**Codesic Internal Use Case Description**	**Summary/Comments**
Prosecutor	AOC	FileCriminalCitation	Criminal Violations (Traffic & Non-Traffic) go to the Prosecutor? After review, the Prosecutors office may file the Citation directly with AOC.
State Toxicology Lab	LEA; Prosecutor; DOL	ReportOnBloodToxicology	Receive back report on Toxicology screen tests
WSDOT	Local Traffic Engineering	RequestCollisionLocationReport	Request for local engineering department to provide consistent location information for Collision report.
WSDOT	Cities, Counties, CRAB, WSP CV Unit	PublishCollisionReport	Publish/Subscribe exchange making collision reports available to subscribing entities.

4 Approach and Deliverables

4.1 Guiding Principles

The consultant team explicitly factored JIN technology principles into the approach used to investigate and compile this report, and ascertained that all recommendations are consistent with the principles. A brief summary of the applicability of each JIN technology principle to this project follows.

4.1.1 Standards

National justice community standards, technology industry standards, and proven analysis approaches were used in analyzing business processes and recommending solutions. In particular, the following standards were investigated and incorporated into the report:

- The Global Justice XML Data Model (GJXDM)
- GJXDM Reference Documents being developed by the national justice community (Ticket, Disposition)
- OASIS LegalXML Electronic Court Filing standards
- The Justice Information Exchange Model (JIEM) and JIEM Reference Model
- Web Services Interoperability Organization (WS-I) standards
- OASIS web services specifications and standards

In addition, the team investigated ongoing work by the Department of Justice's Global Justice Information Sharing Initiative, and its Infrastructure and Standards Working Group, especially in the area of service-oriented architecture for integrated justice.

4.1.2 Interoperability

The project team investigated, as a means of assessing partner readiness, the extent to which partners' new software development efforts (in the areas touched by tickets and traffic records) are focusing on interoperability as an architectural goal. Throughout the

project, the team investigated additional ways to improve interoperability between systems.

4.1.3 Shared Infrastructure

The sharing of infrastructure by disparate systems is made much easier by the adoption of open standards. Consequently, in preparing recommendations, the team first looked to open standards as options for implementing non-functional requirements. In addition, the sharing of infrastructure requires a deliberate approach to evolve and respect rules for the usage of the infrastructure. Consequently, the team sought to recommend a standard JIN project approach (for use on E-TRIP and other JIN exchanges) that encouraged partners to establish exchange standards and conform exchanges to them. Finally, the team's approach was based on the understanding that in the very near future the JIN would implement physical messaging infrastructure to support exchanges.

4.1.4 Security and Privacy

The team investigated the security requirements associated with each exchange as a set of non-functional requirements. Authentication and confidentiality requirements were investigated and documented, as were implementation technologies that would respect the need for each partner to maintain responsibility for securing its data and applications. The team investigated the use of the JIEM modeling tool in the next phase of E-TRIP implementation to enhance the capture of privacy requirements, since JIEM now includes mechanisms for documenting them. The team focused on open-standard security mechanisms to promote interoperability of security implementations across the federated security model of the JIN.

4.1.5 Applications and Data Exchanges

The focus of the team's analysis was in the area of enabling existing applications at AOC, DOL, WSDOT, and law enforcement agencies to exchange E-TRIP information on the JIN. The recommended

architecture and approach leverage partners' existing investments by providing a logical messaging layer between existing applications for the exchange of information.

4.1.6 Reusable Components

The team's approach assumed that the E-TRIP implementation in Washington could leverage (and reuse) components that have been developed in other jurisdictions or at the national level. The team investigated these opportunities for reuse, as discussed in section 4.1.1 (*pg. 14 - Standards*). In addition, the team took an architecture-centric approach to analysis and recommendations, because a viable architecture (and the means to encourage its use) represents an environment in which component reuse can take place. An investment in technical architecture pays off by identifying and documenting reusable components, by encouraging independent testing of components so they can be safely reused, and by promoting standards of interoperability.

Note that by "reuse" this report intends that components would be referenced and extended by E-TRIP (and JIN) exchanges, as opposed to cloned and modified. For schemas (such as national reference exchange documents), reuse would be accomplished by importing and extending rather than copying. For software components, reuse would be accomplished by consuming components at a binary, rather than source code, level.

4.1.7 Washington State Enterprise Architecture Principles

In addition to the JIN technology principles outlined above, the consultant team also attempted whenever possible to synchronize the principles of this project with the principles that have been adopted for State Enterprise Architecture (EA) by the Information Services Board (ISB).

The following principles from state EA are synergistic with the goals of E-TRIP:

- **Commonality.** Business processes, data, and technologies should be common where there is a clear business case; once designated as common, justification is required to deviate.
- **Natural Boundaries.** Business processes, data, and technologies should be designed around natural boundaries.
- **Security.** Business processes, data, and technologies should protect information assets.
- **Interoperability.** Business processes, data, and technologies should enable interoperability.

In promoting the JIN objective of open standards, this report aims to identify areas in which technologies can reasonably be made common across partners. However, this report takes an integration-oriented point of view, in that it respects the natural boundaries around business processes and existing systems. A consistent theme in this analysis, echoing the approach of the JIN, is that existing information system assets should be integrated in a way that decouples them, so that asset owners can evolve them as independently as possible.

Most of the non-functional requirements identified in subsequent sections (and mapped to individual exchanges) focus on security. This report aims to enhance the discussion around security by decomposing a broad topic into more specific requirements, and by mapping those requirements to open standards that can implement them.

Finally, it probably goes without saying that this report identifies exchanges that enhance interoperability. Many of the resultant recommendations are focused on improving interoperability.

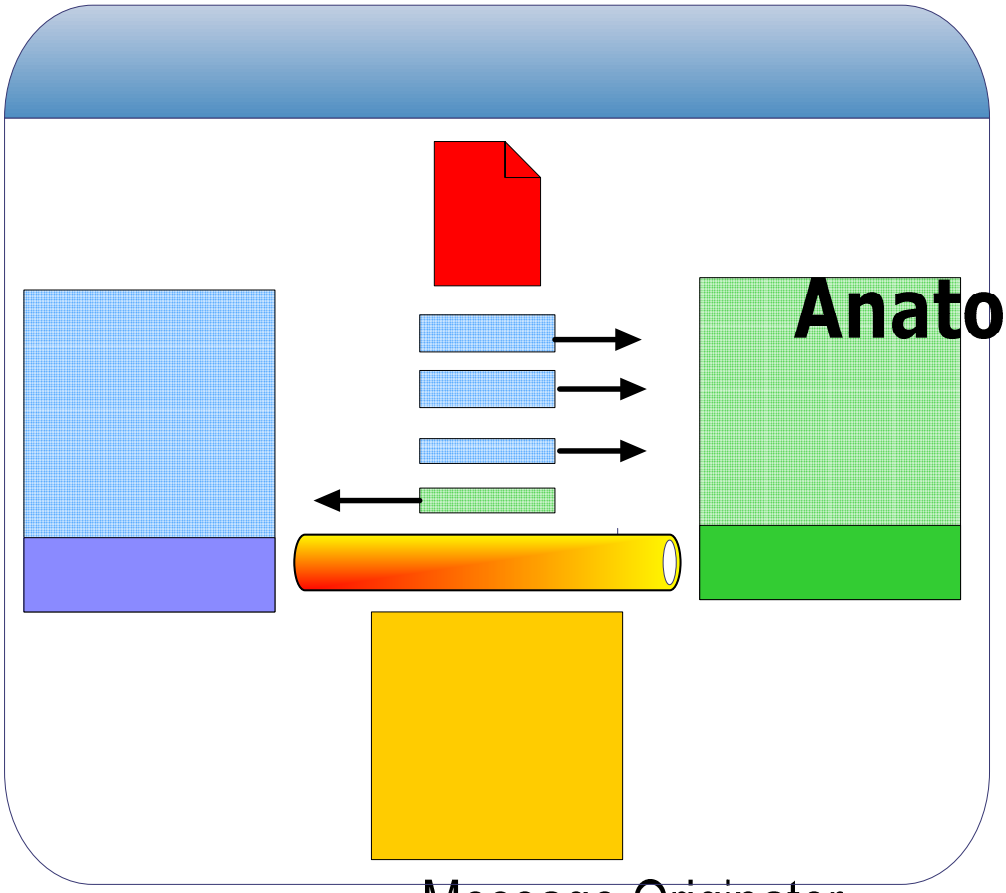
4.2 Develop High-Level Architecture

The initial task of this project was to elaborate and validate the high-level architecture of the E-TRIP initiative. Drawing from the E-Citations technical architecture document prepared by Codesic in December, 2003, we began the process of elaboration of the architecture. Early in the project, the team conducted preliminary meetings with each stakeholder to do the following:

- Provide a preliminary briefing on the process we were going to follow during the elaboration phase.
- Confirm their ownership and stewardship responsibilities for key data repositories.
- Confirm the business processes currently in use and identify any key issues and improvement opportunities not previously understood.
- Begin the process of identification of unique data exchanges, and gain insight into the originating and consuming processes each agency would be developing.

4.3 Identify Exchanges

The key function of this design process was to identify the individual data exchanges and define them as clearly as possible given the significant time constraints of the project. The diagram below outlines the different components of an exchange:



Exchange components are:

- **Message Originator** – Exchange Partner that initiates the first exchange action.
- **Message Responder** – Exchange Partner that receives a "request message" and provides a "response" message in return.
- **Message Consumer** – Exchange partner(s) that receive a message and then commences internal processing of that data. An exchange where there is an originator and a single consumer, the message action is typically a "Post" to a particular "Queue". Where a message has more than one consumer, the message action is typically a "Publish" to a "Topic" and all consumers are "Subscribers" to that topic.
- **Message Transport Infrastructure –** The hardware, software and communications components that provide for the transport of the messages and that provide the necessary transport services.

- **Message Payload –** The XML data that is transferred between the exchange partners consistent with the rules enforced by the Message Transport Infrastructure.
- **Message Actions –** Every message in an XML exchange is action oriented in that by sending it, the exchange partner is either initiating an action by a consuming partner, answering a request of an originating partner as a part of a larger process. Typical message actions are:
    - **Post** – Send a message to a queue
    - **Publish -** Send a message to a topic
    - **Subscribe -** Listen for messages on a topic and receive them when they are published. *(Example, when a ticket or case is adjudicated, Courts may "Publish" the disposition and WSP and DOL may "Subscribe" to the topic and each consume the message)*
    - **Request –** Send a message that requires a response.
    - **Response –** A message that is sent to a requestor containing requested information. *(Example – Law Enforcement may "Request" a Collision ID number from a WSDOT whose Web Service would provide the "Response".)*

- **Originating, Responding and Consuming Services –** These are the building blocks of a Service Oriented Architecture (SOA). These lightweight units of programming code run on computers inside the firewall of their respective agency. A service can be very simple, like receiving a Drivers License Number, and returning the name and address of the person associated with that license. A number of simple services can be "orchestrated" into a complex process using tools generally available from vendors of Message Transport Infrastructure products.

The facilitated sessions we conducted were based on this exchange framework and were designed to include representatives from both the originating and consuming partner (agency). This grouping method assisted in accelerating the elaboration process by having all of the involved parties present as the exchange process was being designed.

4.4 Develop and Validate Message Payloads

Prior to each facilitated session, the assessment team assembled a list of data elements that needed to be shared as a part of each exchange, as determined from examination of paper forms used in current business processes. As a general rule, the team also looked for national justice community reference specifications based on the Global Justice XML Data Model (GJXDM), as well as elements in the SEARCH Justice Information Exchange Model (JIEM) Reference Model. In situations where no national standard had been established (i.e., Collision reports), we looked to other states and other sources for emerging standards.

Each session began with a review of the data exchange payload format that was developed. During that review, sources and repositories for each data element were discussed in order to reveal data retrieval and persistence issues that would add complexity to the development effort.

4.5 Assess Current Process and Identify Current Issues

During each session, we walked through and discussed the existing processes and any prior attempts to automate a similar exchange. During this portion of the session, we attempted to identify those subsystems of each partner that would likely be impacted by implementing the XML exchange. This information formed the basis of our Partner Readiness assessment.

4.6 Evaluate Partner Readiness

After discussing the requirements for implementation of the exchange, each partner summarized their current state of readiness of their systems to accommodate the needs of their E-TRIP components. These self-assessments and our experience with each agency formed the basis of our Partner Readiness assessments found in Section 8 *(pg. 35- Partner Readiness*

Partner Readiness). Factors such as current and "near future" platforms, current internal initiatives (available staff capacity) and prior experience with Service Oriented Architecture (SOA) became the determinants of Partner Readiness and were considered in our schedule estimates.

4.7 Compile Recommendations

Over the course of the project, team members and stakeholders identified a number of factors that we feel are key elements for success in the development and implementation phases. These elements are compiled and refined in Section 11 (*pg. 71- Recommendations*). The recommendations contained in Section 11 should not necessarily be viewed as hard requirements. Rather, they are a distillation of best practices pertaining to justice integration that have been vetted through a "look forward" process that maps the requirements of the E-TRIP project with released, or soon to be released national standard reference documents.

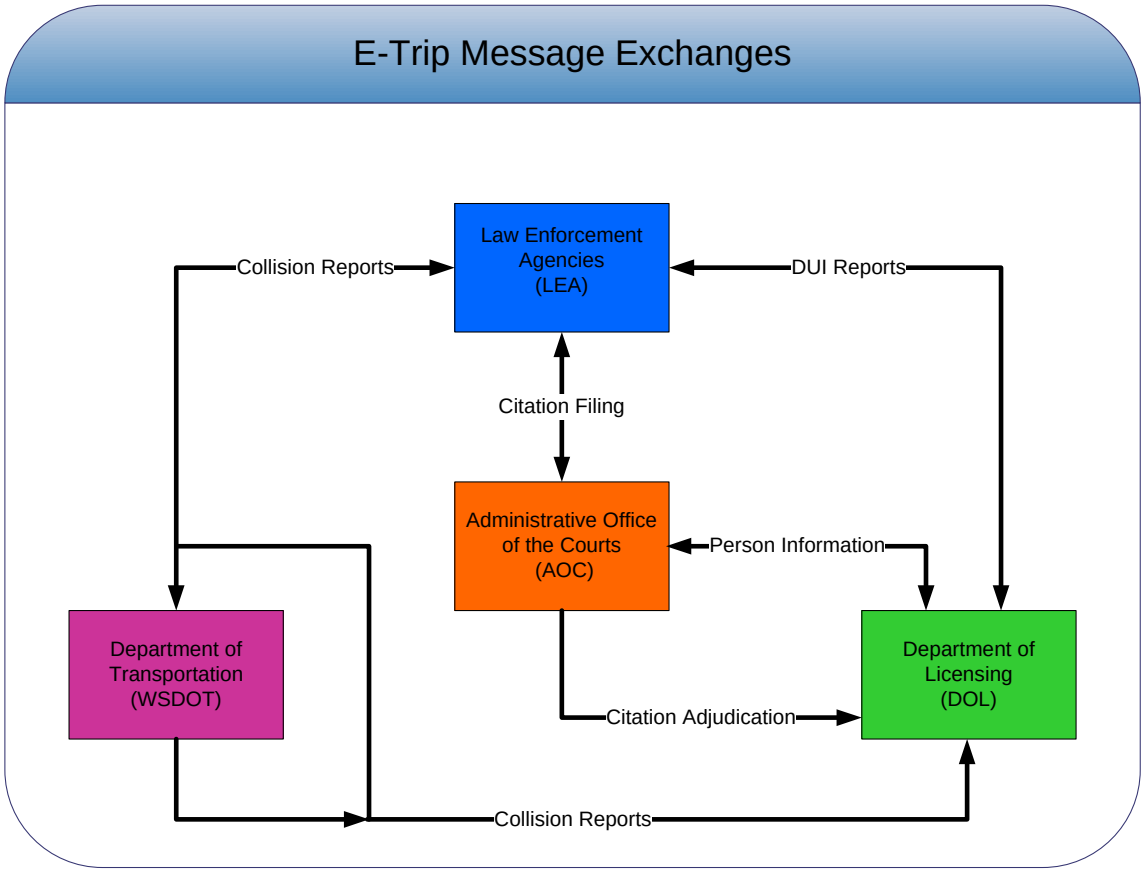
4.8 Estimate Development Schedule

In estimating the schedule and ultimately the cost of development we divided the project up into small 30 day iterations that included tasks for the four major Rational Unified Process (RUP) phases, inception, elaboration, construction and transition.

Each iteration in the schedule was then staffed with resources possessing the skills needed to complete the objectives within the iteration time constraints (30 days). This then created effort estimates (hours) and ultimately costs for each iteration. The cost and schedule assumptions and summary are found in Section 9. *(pg. 45-Estimated Schedule and Costs)*

5 E-TRIP Information Flow

The following diagram depicts the flow of information between traffic records partners. The exchanges noted are those that are considered to be the Primary exchanges for the E-TRIP framework. This framework has guided the analysis and recommendations of this project. Over the course of this project, additional potential exchanges were identified, and in some cases, evaluated in modest detail to determine their criticality to the E-TRIP framework. Those exchanges that were not deemed to be Primary, are listed in Section 3.2 (pg. 12- Components out of Scope)



6 Identified Non-Functional Requirements

This section documents non-functional requirements that were considered for applicability to each of the exchanges addressed in this report.

A non-functional requirement is a potential capability of a component that does not provide direct value to the component's users or clients. In the case of message exchanges, non-functional requirements can be viewed as the "rules of engagement" when two integrated components exchange messages with each other. These rules are things that often need to be in place to satisfy the needs of other stakeholders (other than the direct actors participating in the exchange).

This set of non-functional requirements is a candidate list. In the next phase of E-TRIP development, a thorough analysis should be completed to ascertain that all non-functional requirements are accounted for. In particular, this project did not directly consider performance, throughput, or "uptime" requirements for each exchange endpoint; these will be critical factors to establish as implementation moves forward.

Note also that documenting these requirements here does not mean that they are absolute requirements in general or requirements of every exchange. It is possible that the JIN and E-TRIP partners will simply decide not to make one of these candidate requirements an actual requirement. This report will attempt to identify, based on interviews with E-TRIP stakeholders, which candidates are very likely to be actual requirements. (In particular, there was considerable doubt among the interviewed stakeholders that Message Retransmission would end up being an actual E-TRIP or JIN requirement.)

6.1 Message Non-Repudiation

This requirement dictates that the sender of a message cannot deny having sent it at a particular date and time. Also, the sender can later prove having sent the message at a particular date and time.

6.2 Message Integrity

This requirement dictates that the message recipient can verify that message contents are identical to what they were when they left the recipient's control.

6.3 Message Confidentiality

Message contents are only readable by authorized persons or entities. This can apply to entire messages or parts of messages, in that an entity should be authorized to view one part of a message while other parts remain obscured.

This requirement is sometimes known as "encryption", but that's technically an implementation technique, not a requirement.

6.4 Message Reliability

This requirement dictates that delivery of each message to its intended recipient(s) will happen once and only once. This delivery is guaranteed, in the sense that once the sender sends the message, the sender can assume the message will be received, unless notification to the contrary is provided to the sender. If the recipient is not immediately available to receive the message, it will be stored in-transit for a specified period of time before delivery fails and notification is sent to the sender.

It is likely that, in the case of undeliverable messages, the failure notification will need to be sent to parties other than the sender (e.g., a JIN support mechanism.) This is to ensure timely correction of any problems even when the original sender is unable to respond in a timely fashion.

6.5 Message Authentication

This requirement dictates that the component receiving a message must be provided with information (credentials) so that it can verify the identity of the sending component.

6.6 Message Uniqueness

This requirement dictates that once a message is created, it is associated with an identifier that uniquely identifies it for all time, by distinguishing it from all other messages. Consequently, possession of the unique identifier should permit the holder to search for and find the original message and only that message.

6.7 Message Retransmission

This requirement dictates that a message recipient can request that the sender re-send all messages that meet certain criteria, notably a range of transmission date/time values.

6.8 Logging and Auditing

This requirement is an extension of Message Non-Repudiation. It dictates that each message transmitted using the JIN infrastructure is logged in a central repository, so that information about the message transmission can later be retrieved and analyzed.

6.9 Document Retention

Many E-TRIP and JIN partners are currently required by statute or regulation to retain paper documents for a period of time. The implications of document retention in an electronic world (where conceivably the functional equivalents of current paper documents would never actually be printed) need to be ascertained.

7 Identified Exchanges

This section describes each of the in-scope exchanges analyzed by this project.

7.1 Ticket Filing (Law Enforcement – Courts)

7.1.1 Current Business Process

Tickets (criminal and non-criminal, traffic and non-traffic) are currently issued by law enforcement to offenders on paper forms that are standardized statewide. These papers forms consist of several carbon-copies. After a ticket is issued to an offender, the law enforcement officer separates the carbon copies, gives one to the offender, and submits others to the court for filing and adjudication.

When the ticket arrives at the court, staff key information from the paper form into the District Court Information System (DISCIS) and existing Judicial Information System (JIS).

In performing this data entry, if court staff encounters a person whose information does not currently exist in JIS, a search is performed via direct access to DOL's driver record abstract screen. If the person's information is found, JIS "scrapes" the information into the JIS database. In cases where staff find the offender's information in JIS, the system performs an automatic comparison of the JIS information with the DOL driver record abstract to verify correctness.

After entering and verifying the offender information, court staff enters the remaining ticket information into DISCIS/JIS.

The courts in Washington currently process nearly 1.4 million tickets per year in this manner.

7.1.2 Message Structure

Ticket information consists of information about the subject (if the ticket is a traffic ticket, this information usually comes from the motorist's drivers license); information about the vehicle (if a traffic ticket); and information about the incident (date/time, statute violated, posted/actual speed if a traffic ticket). In addition, officers tabulate penalty or bail amounts on the ticket, and note information about the issuing officer.

In the next phase of E-TRIP implementation, it should be noted that a national reference exchange document exists for tickets. This reference document is maintained by the National Center for State Courts.

The details of this exchange have been provided to AOC under separate cover. To ensure consistent versioning of the schemas as they evolve, AOC has indicated its intent to maintain these schemas in a central repository and make them available to E-Trip stakeholders for comment, revision and reference.

7.1.3 Applicable Non-Functional Requirements

The following non-functional requirements need to be implemented with this exchange:

- Message Integrity
- Message Confidentiality
- Message Reliability
- Message Authentication
- Message Uniqueness
- Logging and Auditing

7.1.4 Recommended Implementation Approach

The following approach to implementing this exchange is recommended.

It is recommended that the courts endpoint of this exchange be viewed as an electronic document filing scenario, to be handled in the same way that the courts plan to handle all other electronic filing. To the extent possible, courts should adopt the emerging OASIS LegalXML Electronic Court Filing "Blue" standard, which identifies three major components, as follows.

A *filing assembly component* is the interface to filers, which in this case means law enforcement. In the court filing standard, the filing assembly component is standardized only in the messages it sends to and receives from the court.

A *filing review component* is the court's filing "hub" that receives filings from one or more filing assembly components. After receiving a filing, the filing review component submits the filing to automated or manual review. In most cases, manual review will be necessary; in ticket filing, it is expected that person identification will require manual clerk review for the foreseeable future. After a filing has passed review, the filing review component forwards the filing information on to backend court systems.

Backend court systems are encapsulated behind the third component, called the *electronic court record component*. This component is responsible for triggering workflows in case management and document management systems within the court domain.
It is recommended that the Administrative Office of the Courts (AOC) begin investigating means to host a filing review component for Washington courts. The current Open XML Court Interface (OXCI) code base may be a good place to start this investigation, though OXCI does not implement the emerging standard and may or may not do so in the future. It may be feasible for AOC to implement the filing review component and electronic court record component *just* for electronic tickets, replacing those implementations of the standard interfaces with off-the-shelf solutions as they become available.

The implementation of the electronic court record component would interact with the DISCIS and JIS systems via screen-scraping, using IBM's Host-On-Demand product as detailed later in Section 8 *(pg. 35- Partner Readiness* and Section 11 *(pg. 71- Recommendations).*

It is recommended that the law enforcement endpoint of this exchange be implemented as a filing assembly component, according to the OASIS electronic filing standard. The consequence of this recommendation is that procurement of police records management systems, as well as any procurement of ticket field entry devices, should ensure that the purchased solution(s) are consistent with an open web services, message-based architecture as described in this report.

It should be noted that the OASIS electronic court filing standard supports open web services standards, as defined by the Web Services Interoperability Organization (WS-I) and other OASIS technical committees (such as WS-Reliability.) This ensures the broadest development platform support for the standard.

7.2 Ticket Disposition Reporting (Courts – Department of Licensing)

7.2.1 Current Business Process

After a court of limited jurisdiction resolves a case associated with a ticket, the court forwards one of the original ticket carbon copies to the Department of Licensing. The forwarded copy includes information about the disposition of the case.

Court staff enters much of the information into DISCIS that is needed by DOL, yet the paper-based process requires DOL staff to re-key this common information. An electronic data exchange would eliminate this redundant data entry.

Currently, the Seattle Municipal Court forwards this information to DOL via batch uploading of a flat text file. This measure has improved processing time and reduced workload at DOL, demonstrating the business case for electronic exchange of the information.

7.2.2 Message Structure

The information sent from Courts to DOL will contain information on the original ticket, plus information about the disposition of the case. The requirements of the DOL systems will determine which of the message elements will be used.

The details of this exchange have been provided to AOC under separate cover. To ensure consistent versioning of the schemas as they evolve, AOC has indicated its intent to maintain these schemas in a central repository and make them available to E-Trip stakeholders for comment, revision and reference.

In the next phase of E-TRIP implementation, it should be noted that a national reference exchange document exists for court dispositions, which could be used as the basis for the schema for this exchange. This reference document is maintained by the National Center for State Courts.

7.2.3 Applicable Non-Functional Requirements

The following non-functional requirements need to be implemented with this exchange:

- Message Integrity
- Message Confidentiality
- Message Reliability
- Message Authentication
- Message Uniqueness
- Logging and Auditing

7.2.4 Recommended Implementation Approach

It is recommended that the endpoints of this exchange be implemented as standard web services, in a way consistent with the architectural and other recommendations of this report.

At the Courts endpoint of this exchange, AOC should leverage the current disposition reporting effort whose goal is exchange of felony disposition information with Washington State Patrol. However, the current disposition exchange implementation will require significant modification to be consistent with the emerging JIN architecture (and the recommendations of this report); in particular, the disposition exchange schema is not GJXDM-conformant, and the web services interfaces are not based upon WS-I and WS-Reliability. The current effort is also exchanging data only with WSP, and was not designed to "broadcast" disposition messages to multiple partners.

At the DOL endpoint of this exchange, the agency's .NET re-platforming effort should provide service-oriented access to the screens currently used to enter disposition information from ticket copies into the driver history system. DOL should investigate utilizing these services to facilitate automated updates. It is unclear the extent to which manual review or correction of exceptions will be required, except to say that these measures will be necessary for some number of cases.

7.3 Collision Reports (Law Enforcement – Department of Transportation and Department of Licensing)

7.3.1 Current Business Process

Currently, upon investigating a collision, law enforcement officers complete a paper form (issued by Washington State Patrol) and send it within four days to the Washington State Patrol in Olympia (RCW 46.052.030). WSP staff, housed at WSDOT, scans report documents into a document management system and manually key index data from the document into a WSDOT tracking system.

WSDOT currently sends a batch of information from collision reports to DOL on a weekly basis, as well as provides information "feeds" to other organizations (cities, counties, and the County Road Administration Board (CRAB)).

7.3.2 Message Structure

The information sent from law enforcement to WSDOT includes information about involved drivers, pedestrians, pedal cyclists, property owners, vehicles, passengers, witnesses, vehicle damage, and accident information (location, type of road, etc.) WSDOT sends DOL a small subset of this information.

7.3.3 Applicable Non-Functional Requirements

The following non-functional requirements need to be implemented with this exchange:

- Message Integrity
- Message Confidentiality
- Message Reliability
- Message Authentication
- Message Uniqueness
- Logging and Auditing

7.3.4 Recommended Implementation Approach

It is recommended that the endpoints of this exchange be implemented as standard web services, in a way consistent with the architectural and other recommendations of this report.

The recommended approach (and associated issues) for the law enforcement endpoint of this exchange are the same as for the Ticket Filing exchange documented above *(section 7.1 pg. 27- Ticket Filing (Law Enforcement – Courts).*

At the WSDOT endpoint of this exchange, there are two main options for implementation. First, the existing collision tracking system (developed in VB6 with SQL Server) could remain intact, and a web service façade could be built around it (either using VB6-based web services infrastructure or, preferably, .NET). Alternatively, the collision tracking system could be migrated to .NET (which is something WSDOT likely will need to do eventually); this migration would allow more direct exposure of the system's functionality as web services.

As with the other E-TRIP exchanges documented here, the DOL implementation will largely consist of accessing web-service versions of current mainframe data entry screens.

The E-TRIP partners should consider eliminating the current two-step exchange process used currently (law enforcement to WSDOT, WSDOT to DOL). The recommended JIN architecture supports simultaneous message delivery to two recipients. One hurdle to doing so will be identifying a mechanism for the partners to assign a single, global unique identifier that would permit them to track the report over time and across each others' systems.

8 Partner Readiness

In this section, we discuss the status of the E-TRIP participants, in terms of their readiness to build and support their respective endpoints of the exchanges described earlier. We consider "readiness" along the following dimensions:

- Whether message data are currently captured and maintained in electronic form in the partner's systems, or whether there are plans to capture the data electronically in the near future
- Whether existing systems involved in the exchanges are capable of web services integration directly, or whether a clear technical strategy is available to provide such integration
- Whether partner IT staff are prepared to develop, manage, and maintain systems, services, and interfaces required of the exchanges

Regardless of the technical readiness of any partner, skilled and experienced resources are available from third party consulting firms and can be utilized on an as needed basis. Smaller State agencies, Counties and LEA's may benefit from collaborating on the creation of similar exchange service components.

8.1 Law Enforcement

8.1.1 Data Collection Readiness

The law enforcement community in Washington exhibits a wide variety of technical architectures, existing IT systems, business processes, and staff IT experience. Consequently, it is difficult to provide an overall readiness assessment for law enforcement in general.

During this project, consultants interviewed representatives from the Washington State Patrol (WSP), Law Enforcement Support Agency (LESA) for Pierce County, and the Washington Association of Sheriffs and Police Chiefs (WASPC). An attempt was made to collect information about records management system (RMS) capabilities at all law enforcement agencies statewide, but it quickly became apparent that no consolidated set of RMS information exists, and that

it would take more time to produce than could be allotted during this project.

From interviews with LESA and WSP, and from previous assessments and pilots of electronic tickets in Washington, it is clear that no law enforcement agency in Washington is currently creating tickets electronically (except for some jurisdictions creating Parking Tickets electronically). Therefore, all traffic and most parking tickets in the state are handwritten by police officers on the existing pattern form. The exchange of information with the courts occurs when law enforcement files the original paper ticket with the appropriate District or Municipal Court. Many law enforcement agencies record some of the ticket information (e.g., officer identifying information, ticket number) in their RMS; this information is keyed by records staff.

LESA confirmed in interviews that it plans to begin issuing tickets using a computer device sometime in 2005. LESA is ready to do so now; it has been delaying this effort until the JIN and traffic records committee decide on exchange standards. The LESA architecture allows for the easy addition of new forms (like tickets) to their officer support (mobile) system.

The analysis in this section applies equally to the other information that originates with law enforcement relevant to the exchanges identified in this project. Currently police officers hand-write and submit paper reports for collisions, and sworn reports for DUI violations. Law enforcement agencies vary in the degree to which they capture the information from these forms electronically.

8.1.2 Systems Readiness

As stated above, the law enforcement community in Washington exhibits a wide variety of technical architectures. In the short time allotted for this project, it was not possible to perform a detailed assessment of the architectural capabilities of every law enforcement

agency in the state. However, a representative sampling of law enforcement agencies was attempted to get an idea of the different kinds of architecture in place statewide.

Interviews with LESA confirmed a high degree of technical systems readiness to participate in exchanges. LESA has integrated some local systems via web services already, confirming the capabilities of its architecture. In addition, the current pending Request for Proposal (RFP) issued by the City of Seattle for a CAD/RMS system for the Seattle Police Department asks bidders to identify their solutions' ability to integrate with external systems. (However, the RFP does not specifically mention web services or any particular integration platform.)

Commercial records management systems exhibit varying degrees of web services integration potential. RMS vendors are recognizing the importance of integrated justice, and have begun to incorporate integration points (using standards like GJXDM) into their products. However, taking advantage of these integration points usually requires the agency to have installed the most recent versions of these systems. And some commercial RMS products still do not offer easy web services-based integration. Further investigation of the integration potential of each law enforcement agency's RMS and other systems is needed to assess law enforcement's readiness more precisely.

8.1.3 IT Staff Readiness

Again, the readiness of law enforcement agency staff (IT staff in particular) to develop, manage, and maintain exchange endpoints that employ web services varies significantly across agencies. Larger agencies generally have staff (or relationships with contractors) who have assisted in current or past integration efforts in their county or city. (Many of these integration projects were not based on web

services, however.) Some law enforcement agencies (such as LESA) have staff with direct web services development experience.

It is unclear the extent to which law enforcement IT staff around the state have experience with the Global Justice XML Data Model (GJXDM), which is the justice XML vocabulary on which E-TRIP exchanges will be based.

8.2 Courts

8.2.1 Data Collection Readiness

Washington Courts maintain most case information in case management systems hosted at the Administrative Office of the Courts (AOC). In particular, limited-jurisdiction courts, that have jurisdiction over tickets, maintain case information in the District Court Information System (DISCIS) and Justice Information System (JIS). For information tracked by these systems, the Courts are well-positioned to provide data electronically to exchange partners. Some limited jurisdiction courts maintain there own case management systems outside the systems provided by AOC. Review of those systems was considered outside the scope of this project.

In stakeholder interviews, it was determined that there will be information on tickets that needs to be shared with other stakeholders after processing by the Courts (e.g., dispositions to law enforcement and the Department of Licensing), but that is not stored in DISCIS/JIS. To be able to share this information with partners, the Courts will need to store it somewhere, either in a relational database structure, XML document structure, or some other way. Accomplishing this may require changes to DISCIS/JIS, or alternatively development of an additional system to manage this information.

AOC previously developed an additional database to store ticket information, in support of the e-citation pilot project conducted in

2003. This solution should be examined carefully to assess whether it can serve as the platform for supporting E-TRIP exchanges.

8.2.2 Systems Readiness

The existing DISCIS and JIS systems at AOC are written in the Natural programming language and store case information in a DB2 database. Both database and application code are hosted on an IBM mainframe running OS/390. Users interact with DISCIS/JIS via 3270 screens. While DISCIS/JIS run within CICS, AOC technical staff confirmed in interviews that each user's session in DISCIS/JIS is effectively one large CICS transaction. AOC technical staff also confirmed that the internal design of DISCIS/JIS does not effectively separate user interface from business logic. This limits the extent to which other systems can directly access the business functionality in the software, and compels integration via programmatic interaction with the 3270 screens. (This approach is commonly called "screen-scraping.")

AOC has experience with IBM's 3270 programmatic emulation solution, called Host-On-Demand. This solution provides a simple grid-based and field-based Java API for interacting with 3270 applications programmatically. AOC staff previously used Host-On-Demand to support the 2003 e-citation pilot project, and found the API and toolkit straightforward to use, and robust and stable in operation. It requires little additional infrastructure to be installed at AOC (it is implemented as a set of four Java "jar" files that can simply be included in a J2EE enterprise application package implementing a web service.)

Initiating exchanges from DISCIS/JIS (for example, the person information exchange with DOL) will likely prove to be more challenging. The Natural programming language does not have good support for standard web services protocols. Consequently, it will likely be necessary to build an intermediary integration point using, for example, a DB2 stored procedure or COBOL module, to interact with partner web services on one side and the existing Natural code on the

other. This approach requires more investigation and testing to confirm its viability.

It should be noted that AOC is currently undertaking a migration of its mainframe-based case management systems (for all court levels, including the District and Municipal courts) to a service-oriented architecture built on the Java 2 platform. Once this migration is complete, programmatic access to case-initiation functionality via web services should be easier. The extent to which the emerging architecture exposes well-defined services for case filing workflows will largely determine the effort required to implement E-TRIP exchanges.

8.2.3 IT Staff Readiness

Some AOC IT staff working on the migration project have direct experience with web services technologies. Some staff also have experience with the Global Justice XML Data Model (GJXDM), the justice XML vocabulary to be used for E-TRIP exchanges.

8.3 Department of Licensing

8.3.1 Data Collection Readiness

Since no E-TRIP exchanges originate with the Department of Licensing, consideration of whether DOL collects exchange data electronically is not relevant to this report.

8.3.2 Systems Readiness

The most important element of DOL's systems readiness is the Department's "re-platforming" of driver and vehicle licensing support systems from COBOL running on a Unisys mainframe to Fujitsu's COBOL.NET running under the Microsoft .NET platform on Windows servers. This migration effort is already complete for vehicle systems; driver systems are scheduled to be completed by February, 2005. The

migration involves no new functionality or even re-development of existing functions in a more object- or component-oriented architecture. Converting current functionality to an object-oriented architecture (using a "native" .NET language like Visual Basic .NET or C#) may be scheduled in future phases.

DOL IT staff confirmed in interviews that the "re-platforming" of existing COBOL code is occurring on a screen-by-screen, transaction-by-transaction basis. That is, after migration, DOL will have individual components (coded in COBOL.NET) corresponding to existing Unisys COBOL screens and transactions. These components will expose programmatically the functionality currently exposed to end-users via 3270 screens. (End-users will still use 3270 screens as the user interface to the re-platformed components.)
A key advantage of deploying functionality on the .NET platform is in the ability of .NET components to expose their interfaces as web services. DOL IT staff confirmed in interviews that this ability is available for COBOL.NET components as well as components developed in a "native" .NET language. This will allow DOL to expose functionality required for exchanges (such as the driver record abstract, recording of dispositions, and recording of information from DUI sworn reports) as web services without significant additional effort (and little or no additional programming code).

The specific nature of the .NET component web services needs to be explored in detail. In particular, testing will be required to ascertain the degree to which the services comply with Web Services Interoperability (WS-I) standards, and whether the services are able to implement identified technical system requirements fully. It may be necessary for DOL to build "façade" services on top of the services exposed directly by .NET; the façade would provide an architectural layer in which DOL could implement JIN- and DOL-mandated technical system requirements. This approach may be advisable in any case, since it would effectively insulate the JIN from changes to the interfaces of DOL systems.

DOL business experts confirmed in interviews that the Department may have a need to retain messages as submitted by partners (in addition to extracting information from the messages for input into systems.) This possibility is driven by document retention requirements. If identified as a requirement, DOL will need to investigate storage and management solutions.

8.3.3 IT Staff Readiness

DOL IT staff are currently undergoing training in web services technologies as part of the Department's migration to the .NET platform. Some staff have implementation experience with development of web services on top of re-platformed components. Staff have limited experience working with the Global Justice XML Data Model, which is the justice XML vocabulary to be used as the basis for JIN exchanges.

8.4 Department of Transportation

8.4.1 Data Collection Readiness

Of the identified exchanges considered during this project, WSDOT originates a transaction only in the exchange of collision reports with the Department of Licensing. For WSDOT to participate in this exchange, it will need to maintain collision report information electronically.

The current collision report process at WSDOT does maintain collision report information electronically. Since all collision reports are currently completed by Law Enforcement officers or Citizens on paper, these paper reports are transmitted (usually via postal delivery) to WSDOT, where staff of the Washington State Patrol 1.) check them for completeness, 2.) Scan them into a WSDOT document imaging system and 3.) enter a limited number of fields as metadata into a WSDOT

system for report indexing and retrieval purposes. The WSDOT system records the report data in a SQL Server database, and maintains a link in the database to the scanned image. WSDOT staff completes the remaining data entry into their SQL database using the scanned image of the collision report as the source document.

8.4.2 Systems Readiness

The existing WSDOT collision information system was developed in Visual Basic 6 and stores data in a Microsoft SQL Server 2000 database. WSDOT staff confirmed in interviews that it would be fairly easy to add message transmission via web services to the existing system. The existing system has been stable in production since early 2002, with few upgrades, all of which have gone smoothly. It is reasonable to conclude from this that modifications to the system are usually straightforward and low-risk. WSDOT staff confirmed that it is possible to gain programmatic access to the imaging system, which would in turn enable it to interact via web services. However, WSDOT staff confirmed that they have little experience integrating other systems with the imaging system, and expect there would be challenges in doing so. WSDOT may wish to consider migrating the existing system to .NET, which would very likely make exposure of web services much easier although they currently have no plan or funding to accomplish this.

It is reasonable to conclude from this that contingent on resources being available, modifications to the system would be straightforward and low risk.

8.4.3 IT Staff Readiness

WSDOT staff includes two contractors who are very familiar with the existing collision information system. (*WSDOT believes the risks associated with making major enhancements to the current system go up if they are unable to*

retain these existing contractors). This experience will clearly be invaluable as WSDOT pursues integrating web services into the system. Up to three WSDOT staff developers are very comfortable with the .NET platform, and some have experience with web services development. WSDOT staff is comfortable with XML and XSLT style sheets, but have limited experience with XML Schema. The Staff has very limited experience with the Global Justice XML Data Model (GJXDM.)

9 Estimated Schedule and Costs

This section suggests an estimated schedule and costs for implementation of the in-scope traffic records exchanges.

9.1 Assumptions

This section documents assumptions on which the development and implementation schedules are based. Any determination that these assumptions are invalid must be accompanied by a re-estimation of the development and implementation costs and schedules.

9.1.1 General Assumptions

The following assumptions apply to all E-TRIP exchanges. In the estimated schedule and cost sections below, it is assumed that:

- Appropriate network connectivity, hardware, software, and messaging infrastructure are in place, operational, tested, and supported prior to the start of the construction during the development phase
- The JIN architectural elements identified in section 10 ("Implications for JIN Architecture") are in place prior to or in tandem (and coordination) with the development phase; in particular, Public Key Infrastructure (PKI) to support security requirements and UDDI infrastructure (or an equivalent) to support location independence are in place, operational, tested, and supported
- Involved partners are able to reach agreement on project scope and individual partner responsibilities associated with the development phase
    - Agreement on message structures
    - Agreement on implementation of non-functional requirements

    - Agreement on division of responsibilities for implementing the message exchanges
- Involved partners are able to contribute necessary resources to the implementation of their endpoints, including:
    - Implementing infrastructure to enable legacy system integration (including testing) in accordance with JIN architecture and standards
    - Business experts and technical experts to facilitate legacy system integration
- The JIN and individual partners are able to procure skilled software development resources, with particular skills and experience in:
    - The web services standards recommended in this report, or alternatives chosen by JIN
    - XML technologies (XML, XML Schema, XSLT)
    - National justice community standards like GJXDM (including GJXDM schema package structure, availability and applicability of national reference exchange documents)
    - Exposing legacy system functionality in a service-oriented architecture
    - Justice domain experience, especially with respect to electronic tickets, electronic court filing, and traffic records
    - Experience with the messaging/integration platform selected by JIN in early 2005
- A governance process is in place to handle architectural issues that arise, especially having to do with the development of common architectural elements across JIN projects

9.1.2 Assumptions for the Ticket Filing Exchange

For the Ticket Filing exchange between Law Enforcement and Courts, it is assumed that:

- Some data capture mechanism (whether TraCS or some other solution) is available in at least some law enforcement agencies to enable the electronic encoding of ticket information

- The law enforcement community is able to identify one or more locations, either at the local or state (i.e., WSP) level, to host the law enforcement endpoint(s) of the exchange
- The IBM Host-on-Demand screen-scraping product performs adequately as a means of programmatically accessing DISCIS and JIS case- and person-entry screens
- Since screen-scraping is the recommended approach to integration of AOC systems, it is assumed that the involved DISCIS and JIS screens remain static
- Since the recommended architecture views the filing of tickets as an electronic case filing activity, and recommends the leveraging of the emerging OASIS LegalXML Court Filing "Blue" standard, it is assumed that enough of that standard becomes stable during the development phase to prevent excessive rework

9.2 Parallel Phases: Development and Implementation

The fundamental goal of the E-TRIP effort can be viewed as two closely related yet separate sets of activities: Development and Implementation. It is a recommendation of this report that these activities be organized into *phases* that take place in parallel and in coordination with one another.

The purpose of the development phase is to design, build, and test data exchanges between the JIN partners. As exchange design and construction proceeds, JIN architecture and standards will mature, both in the robustness of the architecture itself as well as in the degree to which it is formalized and documented. The JIN partners should anticipate that in the earlier part of the development phase, there will necessarily be more effort expended on evolving architecture and standards. Also in the early part of the phase, major infrastructure components (such as a messaging platform) will be selected and implemented. Consequently, the focus for E-TRIP (and the JIN overall) during the early part of the development phase should be on identifying risks and formulating mitigation strategies for them. Out of this will emerge an architecture that will allow later development phase efforts to proceed more quickly and with much lower risk.

This report envisions a series of development phases over the lifetime of the JIN. A single development phase represents a set of exchanges or other functionality released as a unit. Each phase goes through its own lifecycle, as outlined in the subsequent sections. In the sections to follow, this report focuses on the initial development phase, aimed at a release of a set of exchanges in the summer of 2005. At the end of the development phase section, the report suggests what future development phases (and releases) may look like.

The purpose of the implementation phase is to deploy the developed data exchanges at each partner, utilizing JIN infrastructure. For "centralized" partner deployments (e.g., when the endpoint is deployed at only one location, such as at a state agency), the implementation phase deployment activities will be closely aligned with development phase activities. For "distributed" partner deployments (e.g., when the endpoint is distributed across many locations, such as at the many law enforcement agencies statewide), the implementation phase deployment activities will be distributed over time, with an initial deployment for one or more "early adopter" agency endpoints being closely aligned with development phase activities.

The remainder of this section will propose project plans (estimated schedules) and estimated costs for the initial development and implementation phases. In reading and interpreting what follows, it is important to note that a software development project plan is a living, changing document. A project plan is not a detailed prescription for how a project will proceed; rather, it is a best estimate given current information as to what will be accomplished when and in what order. The estimates presented here are imprecise, since a limited amount of information has gone into them. On a regular basis, all stakeholders should review the plans for these phases and work together to adjust expectations based on information gathered since the last review. Ultimately it will be development teams and JIN stakeholders negotiating over commitments regarding detailed delivery dates, as the development phase moves forward.

9.3 Development Phase Plan and Schedule

This section outlines the plan and schedule for the development phase.

9.3.1 Overall Approach

We propose that the development phase be structured according to the guidance of the Rational Unified Process (RUP). This architecture-centric, iterative development methodology is practiced by some JIN partners already in their internal IT operations, and offers a best-practice approach to maximizing the business value of software development while focusing on risk mitigation.

There are two key features of RUP that this report recommends for adoption by the E-TRIP partners and the JIN. First, RUP suggests that a project be divided into four phases: Inception, Elaboration, Construction, and Transition. The purpose of each of these phases is detailed later in this section. However, note that the transition between phases is marked by formal achievement of a stated milestone, which is associated with the project achieving an identified level of maturity. The second recommended feature of RUP is that, within each phase, the project is governed by a rhythm or pattern of fixed-length iterations of relatively short duration.

This report recommends that the E-TRIP and JIN partners only utilize added detailed RUP guidance if further assessment determines that such a course is warranted. RUP can be utilized in a very "heavyweight" manner that bogs a project down in the creation of superfluous artifacts and documentation; this report strongly recommends that the JIN partners not adopt such a heavyweight approach. As a guiding principle, the partners should carefully examine all documentation-creation efforts before undertaking them, to ascertain whether the documentation created adds enough value to warrant the cost.

Also, it is important to note that structuring the development phase according to RUP does not require that the JIN nor any JIN partners license or purchase RUP or any tools from IBM/Rational Software. RUP is well-described in a number of books, and expert help is readily available from consultants.

For convenience and ease of management, this report recommends fixing all iterations at one month in length. This has the benefit of establishing a consistent rhythm to a project, and encourages a culture of consistent delivery amongst all stakeholders. Project effort can be scaled by increasing the resources devoted to the project (which of course introduces additional project management and oversight.)

9.3.2 Inception Phase

The purpose of the inception phase of a project is to establish rough project scope, feasibility and business case. To a large extent, this purpose is being fulfilled by the current report. This report suggests the set of E-TRIP exchanges that will be in scope, addresses (via non-functional requirements, messaging requirements and implementing standards) a candidate architecture, assesses feasibility, and in so doing reaffirms the cost-effectiveness of pursuing electronic tickets and traffic records first quantified in the E-Citations Proof of Concept Summary Document prepared in 2002 on behalf of Washington State Patrol.

A small set of inception phase work will remain undone after this report is released to AOC. This work should be undertaken by the E-TRIP and JIN stakeholders, and includes:

- Vetting, adapting, and formalizing the recommendations contained in this report
- Formally adopting a candidate architecture for the JIN (as discussed elsewhere in this report)
- Formally deciding to move ahead with the identified exchanges

- Securing the necessary funding and chartering the remaining phases (especially elaboration, which comes next)
- Procuring the necessary services and resources to execute the plan (includes identifying any skills gaps for partner staff and implementing training plans to close them)

In addition, it is important (in validating the business case) that the stakeholders formalize a list of risks associated with the implementation of E-TRIP exchanges. This report provides a useful starting point for this activity, in that the assumptions highlighted earlier in this section, plus the JIN Architecture Implications section (Section 10) later in the document, together encapsulate factors currently in doubt around the JIN effort. If any of these assumptions proves incorrect, or if any of the architectural implications prove unsupportable, then significant changes in approach or cost may ensue. In addition, the recommendations in Section 11 attempt to identify candidate mitigation strategies for many risks that are explicit or implicit in this report. All of these identified risks, regardless of source, should be reviewed by the stakeholders so that a comprehensive approach to risk mitigation can be developed.

The end of the inception phase should be marked by a formal statement, made by the appropriate E-TRIP and JIN governance bodies, that the business case has been made, the project is feasible, and a reasonable candidate architecture has been established. In addition, a set of risks should be identified and viable mitigation strategies established for each risk in the set.

In the plan outlined later in the E-TRIP Roadmap section, it is estimated that if appropriate resources are devoted to the inception phase it could be completed by February 1, 2005.

9.3.3 Elaboration Phase

The purpose of the elaboration phase is to establish a stable architecture to guide the development of E-TRIP (and JIN) exchanges into the future. This architecture is based on the candidate architecture identified in inception (in this case, the candidate identified in this report) and carries that candidate through to actual implementation for a representative use case (exchange). It is important to start implementing exchanges fairly early in the process, not only to demonstrate concrete progress to stakeholders, but also to prove the viability of the identified architecture.

It is important to understand what is meant by the term "architecture" here. Oftentimes, architecture is viewed as a choice of physical infrastructure or platform on which software is executed. It is common to hear discussion of "Java architecture versus .NET architecture," "Windows architecture versus Unix architecture," or "Oracle architecture versus DB2 architecture." Along these lines, it is natural to consider that the chief architectural decision facing the JIN partners right now is the choice of messaging infrastructure (Sonic ESB versus Microsoft BizTalk.)

To be sure, choice of physical infrastructure is an important component of architecture. However, there are other equally important components to consider. A comprehensive picture of an architecture should consider at least four major areas (in the Rational Unified Process, as well as the enterprise architecture world generally, these are called "views"). These views are described in the following table.

View	Purpose	Representative Artifacts
Requirements View	Describe what the system must do to deliver value to stakeholders (its function)	• Use Cases • Non-Functional Requirements • Business Rules
Logical View	Describe what the	• Domain model (UML

View	Purpose	Representative Artifacts
	structure and organization of the system looks like (its design, or form)	class, activity, and sequence diagrams) • WSDL and schemas • Technical standards • Vertical standards (e.g., vocabularies like GJXDM)
Implementation View	How the system is built by developers, in a way that manages risk	• Configuration management plan • Quality assurance plan • Change management plan • Project governance/process • Development standards • Tool selections
Deployment View	How the system is deployed and executed by users	• Deployment diagrams • Network diagrams • Installation/configuration manuals/documents

The overall objective of the elaboration phase is twofold. First, each of these four areas needs to be explored and documented adequately to convince the relevant stakeholders that the project scope is well-understood, and that the project is in fact achievable. Second, enough of a cross-section of the E-TRIP exchanges needs to be implemented in the architecture, to prove its viability.

It is assumed that the deployment view of the architecture, represented by the last bullet in the list above, will be determined largely by the choice of JIN messaging infrastructure, to be made by February 1, 2005.

In some areas, this work will build upon initial deliverable sketches developed during the inception phase. In other areas, the work will explore completely new topics.

In addition, the risk analysis begun in the inception phase should be continued, by continually updating risk mitigation strategies for known

risks, as well as documenting new ones uncovered as the project proceeds.

This report recommends conducting the elaboration phase in two one-month iterations. The first iteration would be devoted to evolving and documenting the E-TRIP integration architecture across the four views listed above (with the focus on the first three). The second iteration would be devoted to proving the architecture by implementing an actual E-TRIP exchange.

It is worth re-emphasizing here two points about this project planning approach. First, this report recommends (as a best practice) fixing the length of development iterations at one month. Experience has shown that establishing a regular project rhythm makes project management considerably easier, and sets clearer expectations with stakeholders. When fixing iteration lengths, there are two ways of doing more work: either schedule additional iterations, or devote more resources within existing iterations. In the development costs section below, this report will recommend the latter approach.

The second point to re-emphasize is that this report's statement that the required work can be completed in two iterations is, at this point, only an estimate. It is based on incomplete information, and is potentially impacted by the many assumptions and risks identified in this report. There will be many opportunities to fine-tune and improve these estimates as the project moves forward; in particular, near the close of the inception phase, this plan should be revisited to make sure it fits information that has been gathered in the meantime. In any case, the JIN partners and other stakeholders should bear these caveats in mind when making decisions based on these estimates.

Also, to the extent the elaboration phase involves purchasing off-the-shelf infrastructure components, it is assumed that once a component is identified it can be purchased very quickly (i.e., within a few

business days.) Lengthy procurement processes for these components will likely result in considerable changes to the plan.

Elaboration Phase Iteration 1

During elaboration phase iteration 1, the project will:

- Fully develop requirements: use cases for each E-TRIP exchange, cross-partner business rules, applicability of non-functional requirements (base these on the JIEM reference model to the extent possible)
- Develop a domain model for each exchange, and evolve a shared model containing reusable components that cross exchanges
- Develop technical descriptions of each exchange, in the form of Web Services Description Language (WSDL) documents that reference GJXDM-conformant schema packages; schemas will leverage national GJXDM reference exchange documents as appropriate
- In developing descriptions of each exchange, it is likely that many exchanges will involve data structures that have no direct representation in GJXDM. The appropriate way to handle these structures (and maintain GJXDM conformance) is to define an extension namespace, in an extension XML schema, that imports, references, and extends GJXDM types and elements. Whenever possible, existing XML vocabularies should be used as the basis for these extensions. During the elaboration phase, the team will identify extensions, and identify where existing XML vocabularies can cover these extensions. The resulting extension schemas will be incorporated into the service descriptions.
- Develop a detailed description of the deployment view (identification of nodes/brokers, physical connectivity, identification of (and selection/procurement of) adapters/connectors for partner systems)

- Develop quality assurance, configuration management, and change management plans (but keep this as lightweight and flexible as possible, while effectively mitigating associated risks)
- Develop a comprehensive description of the JIN E-TRIP architecture, referencing all of the above elements
- Validate key infrastructure components
- Generation of stubs and skeletons off of WSDL; use of these to demonstrate sending and receiving of messages cross-platform
- Sending of a simple message across the new JIN messaging infrastructure
- Basic testing of legacy façade infrastructure (e.g., adapters)
- Basic testing of infrastructure components like PKI, UDDI (or equivalents)
- Electronic filing infrastructure at AOC (implementation of OASIS court filing standard)
- Readiness of one or more law enforcement agencies to integrate ticket filing into their RMS, and/or enter tickets via a field entry device
- Draft Service-Level Agreements (SLAs) between the partners

Elaboration Phase Iteration 2

During elaboration phase iteration 2, the project will:

- Implement the main scenario of Person Information exchange (Courts-DOL)

Implementation of this exchange in iteration 2 will likely result in considerable adjustment to the architectural mechanisms identified in iteration 1. However, this adjustment process should be managed, so that the implementation remains within the identified architecture as much as possible. The intent of the implementation iteration is to produce an exchange working in production, not a throwaway prototype. However, stakeholders should expect this first implementation exercise to be “bumpy” as the architecture is still under development.

Elaboration Milestone

The elaboration phase closes with a formal assessment by the stakeholders that the architecture has reached a stable baseline. Also, a formal decision is made to continue with construction.

Based on the assumptions made in this report, and again under the caveat that schedule could change if unmitigated risks manifest, the estimated completion date of the elaboration phase is April 1, 2005.

9.3.4 Construction Phase

The purpose of the construction phase is to build the E-TRIP exchanges within the architecture base lined in the elaboration phase.

The best that can be done, given the information available at the time this report is being written, is to assign rough iteration objectives to construction iterations. At the end of the elaboration phase, when an architecture has reached baseline status and the stakeholders have much more information, these iteration objectives would likely be adjusted significantly. However, this rough estimation provides a guideline as to what can be accomplished.

In the recommendations section (section 11) later in this report, it is recommended that the JIN adopt common software development best practices on exchange development projects. Among these best practices, configuration management, quality assurance, and change management are particularly important during the construction and implementation phases. It is worth noting that this recommended phased development approach for E-TRIP identifies a “testing” phase. Testing in particular is most effective when it is applied to components as they are developed. It is a strong recommendation of this report that all JIN-funded exchanges or exchanges utilizing the JIN infrastructure follow an “Agile” approach that favors rapid iterations

that place functional prototypes into the hands of the stakeholders early and often in the overall process.

It is also important to note that iteration objectives are stated in terms of functionality that contributes to the value of JIN to its partners and the public. It is a strong recommendation of this report that each JIN iteration be focused on the development of actual exchanges, not just the development of infrastructure or architecture.

9.3.5 Transition Phase

The purpose of the transition phase is to formalize the migration of the releases built in the construction phase into a production environment. For E-TRIP exchanges, this will consist largely of physical configuration and deployment activities at "centralized" partners (e.g., AOC, WSDOT, DOL) and those "distributed" partners (e.g., law enforcement agencies) that are participating right away. The transition phase usually includes system-wide quality assurance testing, finalization of documentation, and formal acceptance of the release by the appropriate stakeholders.

Each development phase should anticipate a transition phase of a single one-month iteration, if proper configuration management and quality assurance have been practiced during elaboration and construction.

9.3.6 Future Development Phases

At the end of the initial development phase, the E-TRIP and JIN partners should assess what the goal of future development phases might be. Assuming that additional development phases are scheduled and funded by the partners, these future phases should be organized and executed using the same lifecycle as has been proposed here.

An inception phase should examine the business case, define the scope of the release, document critical risks and associated mitigation strategies, and determine the feasibility of delivering the release. The elaboration phase in each subsequent development release should be much more modest than the initial one described above, because future development phases will be expected to benefit from high reuse of the JIN architecture. That said, future elaboration phases will still need to build domain models for the exchanges included in their scope, and will need to create exchange descriptions (WSDL and schema) for those exchanges.

In addition, the second development phase (likely starting in Autumn 2005) will require an elaboration phase that consolidates the architectural elements from the ongoing consolidated criminal history query project and the initial E-TRIP exchanges. While effective communication from those efforts during their construction will reduce differences and ultimate rework, it should be expected that without a common architecture for both to follow there will be gaps.

Future construction phases should incorporate the additional out-of-scope exchanges documented earlier in this report. Since the current analysis project did not collect much detail regarding the requirements of these exchanges, it is not possible to estimate iteration objectives in this report.

9.4 Implementation Phase Plan and Schedule

This section describes a plan and schedule for the implementation of E-TRIP exchanges. It decomposes the implementation into two parts: implementation at "centralized" partners like AOC, WSDOT, and DOL where a single partner endpoint will participate in transactions, and implementation for the more "decentralized" law enforcement agencies.

Mostly, the implementation phase involves the release of exchange endpoints into a "production" state in which they are used by the partners to transact

actual business. Following the iterative-and-incremental approach recommended by this report, exchange endpoints could in principle be released as often as monthly. Whether it is advisable to do so will be up for negotiation between the involved partners.

The issue of the maintenance of exchange standards and endpoints is more difficult. As part of the configuration management strategy for the JIN (the development of which is recommended by this report), the partners should establish expectations regarding how often, and by what process, new versions of exchange standards (e.g., WSDL and Schemas) can be updated or endpoints can be altered.

9.4.1 Implementation at "Centralized" Partners

From the development phase schedule described above in section 9.3, and from the E-TRIP roadmap described below in section 9.5, it is possible (again based upon the assumptions documented throughout this report) that initial implementation of the Ticket Filing (Law Enforcement to Courts) and Person Information (Courts to DOL) exchanges could be complete by August, 2005. Exchange of Collision Reports (Law Enforcement to WSDOT and (possibly) DOL) could be implemented by early 2006.

As noted in the development section, the collision reporting exchange could be developed serially with the ticket filing and person information exchanges, thereby compacting the implementation schedule into about eight months. However, before undertaking such a course, the partners should consider the additional risk of accelerating JIN development so quickly, and of having many exchange development projects ongoing at the same time. In addition, it may well place an excessive burden on DOL and Law Enforcement to implement simultaneously several different exchange endpoints.

The implementation plan for the "centralized" partners assumes that one or more initial-adopter law enforcement agencies will be willing to participate at the time the other partners implement their endpoints. Based on this report's assessment of partner readiness, the agencies supported by LESA in Pierce County would be leading candidates for this initial-adopter role.

9.4.2 Implementation at Law Enforcement Agencies

The extent of exchange endpoint implementation at law enforcement agencies beyond the initial adopters will depend on a number of factors, including:

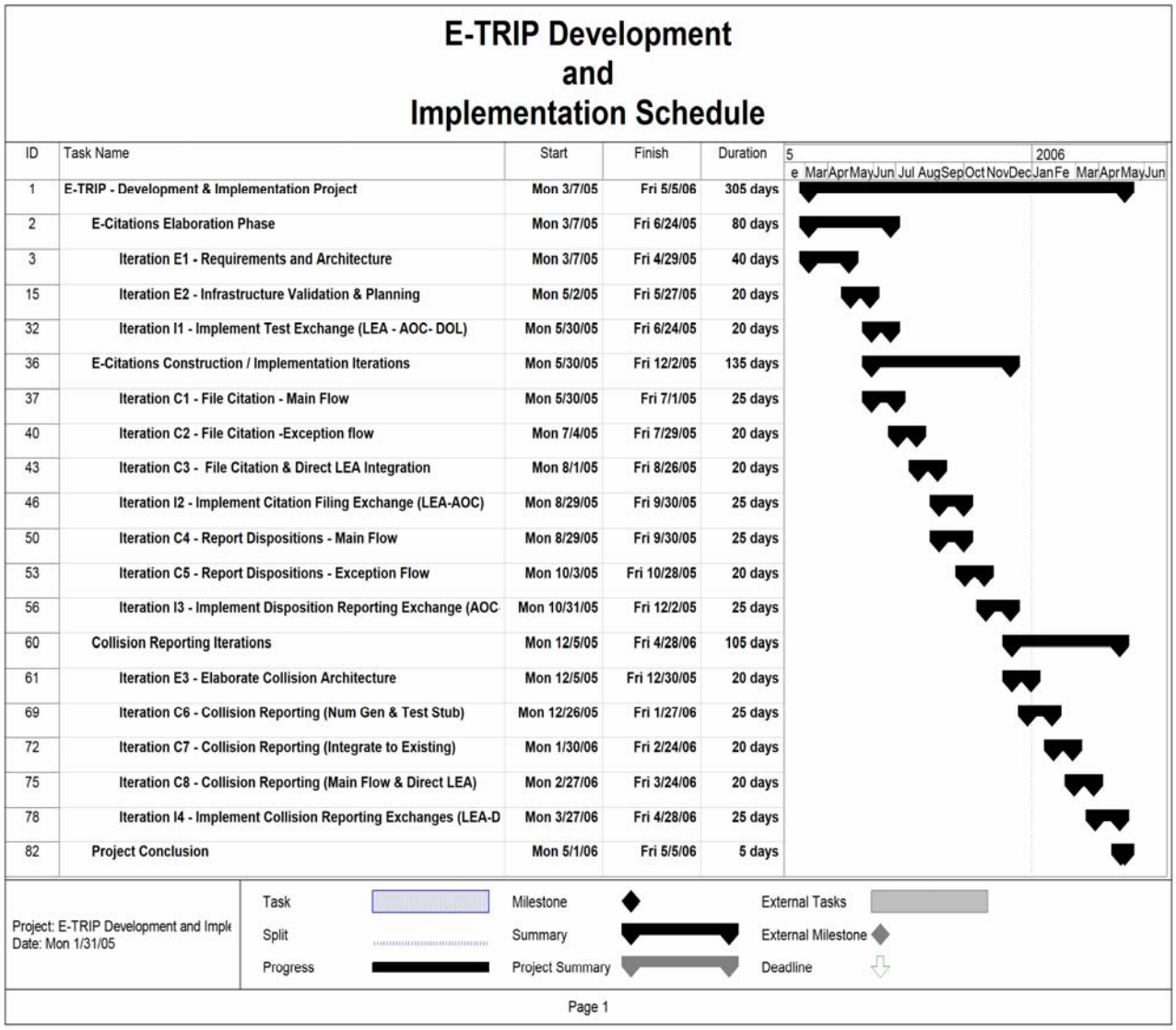
- The successful implementation of field entry solutions at each law enforcement agency
- The ability of police records management systems (RMSes) to file tickets electronically according to JIN and E-TRIP standards (as recommended in this report)
- The ability to remove or effectively work around the current requirement that motorists sign traffic tickets
- The availability of funding to support integration projects at law enforcement agencies

As recommended in the recommendations section (section 11) of this report, widespread adoption by low-volume agencies could be facilitated by development of a web-based interface for filing of tickets. However, using this solution would require participating law enforcement agencies to allocate resources (or find them elsewhere) to perform the data entry, which could have significant impact on agency operations even at very low volumes of a few tickets per day. Nonetheless, providing state or local funding for electronic filing of tickets (via data entry) may well prove cost-effective versus supplying low-volume agencies with electronic field entry device support.

It is a recommendation of this report that LEA implementation focus be placed first on the highest volume agencies, notably the Washington State Patrol (WSP). Since WSP does not currently record extensive ticket information in a records management system, an appropriate short-and medium-term solution for WSP may well be to provide a field entry device (separate from current in-car systems) that would support entry of ticket data in the field.

After WSP, implementation focus should include law enforcement agencies in the larger counties and municipalities. A current opportunity along these lines is the RFP recently issued by the City of Seattle for a records management system and computer-assisted dispatch (RMS/CAD) solution for the Seattle Police Department. It is a recommendation of this report that the City of Seattle prefer CAD/RMS solutions that offer integration points in a manner consistent with the JIN architecture and standards.

9.5 Summary: E-TRIP Roadmap



Note 1: *Actual development occurring in iteration E-1 is intended to assist with the validation and testing of the messaging platform and infrastructure. The project team suggested that the AOC- DOL Name look-up exchange be constructed for this purpose. Since this exchange provides only nominal short term value for Courts, an alternative exchange, LEA-AOC Test suite could be substituted. The test suite would enable LEA's to test their "File Ticket" services independent of Court Development efforts.*

Note 2: *It would be possible to execute these iterations in parallel (especially the disposition reporting and collision reporting iterations), thus accelerating the end of the*

release by five months. However, they are presented serially here for ease of reading. Furthermore, the partners should keep in mind that larger amounts of concurrent work require considerably more facilitation, coordination, and communication, all of which add to project overhead and ultimately to risk. The partners should consider serial development in these early exchange development projects, as a risk mitigation measure.

9.6 Estimated Development & Implementation Costs

In developing the costs for the construction and implementation of the E-TRIP several key assumptions were made.

1. The project would be broken down into a series of 4-5 week iterations so that E-Trip stakeholders would have numerous and frequent opportunities to inspect and provide feedback on deliverables.
2. The work would be done by a technical team of 7 individuals, at least four of whom have worked together before on projects of similar size and who have worked under an Agile / Rapid iteration methodology.
3. All team members have proven project experience developing within a service-oriented architecture using open-standard web services technologies.
4. At least one team member has significant experience developing GJXDM-conformant schema packages.

The make-up of the project team will necessarily change over the course of the project as the work morphs from planning and design into programming, testing and implementation. The table below outlines the various roles needed for the project and provides an estimate of the hours for each resource. Please note that some roles may be filled by the same individual over the course of the project.

Role Description	Hours	Comments
PM /Process Analyst	1,400	
Architect Lead	1,192	
Jr Architect	820	Senior Developer
GJXDM Schema Author	380	Architect Lead
Domain modeler	300	Architect Lead
Requirements Analyst	380	
Developer	7,740	4-5 developers
Tester	1,136	1-2 testers
Total	**13,348**	

The table below summarizes the estimated construction and implementation cost for implementation of the primary E-TRIP exchanges.

NOTE: *These are rough order of magnitude estimates and could vary significantly. We have endeavored to include significant risk buffers into these numbers. Successful mitigation of those risks could reduce the actual project cost by as much as 50%.*

If the JIN chooses a messaging infrastructure that does not provide as base functionality those features outlined in section 6 (Non Functional Requirements page 24), such functionality will need to be programmatically built into the individual services components and could significantly increase the cost estimates suggested in this document.

Construction and Implementation Cost Estimates

Iteration ID	Phase Description	Effort Hours	Finish Date	Iteration Costs	Running Costs
	E-Citations Exchanges (Start 03/07/05)				
E-1	Iteration E1 - Requirements and Architecture	696	4/29/2005	$90,560	90,560
E-2	Iteration E2 - Infrastructure Validation & Planning	1,276	5/27/2005	$155,500	246,060
I-1	Implement Name Look-up or LEA Test Exchange	272	6/24/2005	$29,920	275,980
C-1	Iteration C1 - File Citation -Main Flow	1,360	7/1/2005	$153,200	429,180
C-2	Iteration C2 - File Citation - Exceptions	1,088	7/29/2005	$122,560	551,740
C-3	Iteration C3 - File Citation & Direct LEA Integration	1,088	8/26/2005	$122,560	674,300
I-2	Implement Citation Filing Exchange (LEA-AOC)	340	9/30/2005	$37,400	711,700
C-4	Iteration C4 - Report Dispositions	1,360	9/30/2005	$153,200	864,900
C-5	Iteration C5 - Report Dispositions	1,088	10/28/2005	$122,560	987,460
I-3	Implement Dispositions Reporting Exchange (AOC-DOL)	340	12/2/2005	$37,400	1,024,860
	Total E-Citations Costs	**8,908**		**1,024,860**	**1,024,860**
	WSDOT Collision Reporting				
E-3	Iteration E3- Collision Architecture Elaboration	564	12/30/2005	$71,040	71,040
C-6	Iteration C6 - Collision Reporting	1,360	1/27/2006	$153,200	224,240
C-7	Iteration C7 - Collision Reporting	1,088	2/24/2006	$122,560	346,800
C-8	Iteration C8 - Collision Reporting	1,088	3/24/2006	$122,560	469,360
I-4	Implement Collision Reporting Exchanges (LEA-DOT)	340	4/28/2006	$37,400	506,760
	Total for WSDOT Collision Rreporting	**4,440**		**506,760**	**506,760**
	Project Totals	**13,348**		**1,531,620**	

10 Implications for JIN Architecture

The analysis and findings presented in this report raise an important set of implications for the JIN architecture. The purpose of this section is to document these architectural implications.

10.1 Scalability, Capacity & Sizing

When considering the business case for electronic filing of tickets by law enforcement to the courts, it is important to understand the case volume for each law enforcement agency, as described by this table:

Tickets Per Day	Agencies	Tickets	% Agencies	% Tickets
=0	6	0	1.51%	0.00%
>0,<=1	179	16,478	44.97%	1.30%
>1,<=10	162	211,174	40.70%	16.66%
>10,<=100	49	500,762	12.31%	39.51%
>=100	2	538,908	0.50%	42.52%
Total	**398**	**1,267,322**	**100.00%**	**100.00%**

(Data Source: AOC report from DISCIS/JIS Database for calendar year 2003; data does not include cases filed in Seattle Municipal Court.)

From this table, we see that 185 law enforcement agencies in Washington (about 46 percent) issue less than one ticket per day. Another 162 agencies (about 41 percent) issue between 1 and 10 tickets per day. Fifty-one agencies (12%) represent 82% of the case volume and two of those represent 42% of the tickets. Seattle PD contributes an additional 100,000 tickets (data not included in the table) thus focusing the early implementation efforts on those 5-10 major Law Enforcement agencies would likely yield significant demonstrable benefits for a relatively small investment.

The numbers yield other important metrics with regard to scalability, capacity an sizing of the JIN infrastructure. Including the Seattle estimate we can consider 1,500,000 tickets per year to be a plausible 2003 baseline for capacity planning purposes. If we add an additional 20% to accommodate re-transmission and the addition of supplemental information (very conservative assumption), we arrive at 1,800,000 tickets per year as the 2003 baseline assumption.

In the ideal scenario, all patrol cars would be constantly connected to their agencies, and the flow of tickets would trickle into the system on a 7 by 24 basis. A more realistic viewpoint would suggest that tickets will be aggregated and submitted in batch, probably once a day. Assuming a 2k

(2048 character) payload for each ticket, the following table depicts some estimates for message traffic and bandwidth requirements.

Year	Tickets/Yr	Tickets/ Day	Megabytes/ hour	Bandwidth as % of T-1
2003	1,800,000	6,923	19.38	3.50%
2004	1,890,000	7,269	20.35	3.68%
2005	1,984,500	7,633	21.37	3.86%
2006	2,083,725	8,014	22.44	4.05%
2007	2,187,911	8,415	23.56	4.26%
2008	2,297,307	8,836	24.74	4.47%
2009	2,412,172	9,278	25.98	4.69%
2010	2,532,781	9,741	27.28	4.93%
2011	2,659,420	10,229	28.64	5.17%
2012	2,792,391	10,740	30.07	5.43%
2013	2,932,010	11,277	31.58	5.70%
2014	3,078,611	11,841	33.15	5.99%
2015	3,232,541	12,433	34.81	6.29%

The following assumptions are imbedded in the above table:

- *Table assumes ticket volumes increases 5%/year compounded.(Considered conservative on the high side)*
- *Tickets per day assumes transmission occur only on the 260 business days of a year. (Considered worst case)*
- *"Megabytes / Hour" column assumes that all batch transmissions are commenced and completed during the same 60 minute period each day. (Considered worst case)*
- *T-1 capacity estimated at 1.5 meg/sec less 40% transmission and routing overhead. (Actual overhead will vary based on a number of factors, but should never exceed 40%)*

10.2 Support for WS-I Basic Profile

The recommended message exchange approach identified in section 11.1 above is for partners to expose web services that conform to the Web Services Interoperability Organization (WS-I) Basic Profile 1.1 standard. The infrastructure deployed on the JIN and at each partner endpoint should therefore support and conform to this standard.

10.3 Support for WS-I Basic Security Profile

The recommended implementation of identified security requirements (confidentiality, non-repudiation, authentication, integrity) is for appropriate metadata and payload data to conform to the WS-I Basic Security Profile 1.0, and for authentication credentials to be communicated between partners using the WS-Security 1.0 SAML Profile. The infrastructure deployed on the JIN and at each partner endpoint should therefore support construction and transmission of messages conformant with these standards. Alternatively, the JIN and partner endpoint infrastructure needs to support the security requirements with equivalent mechanisms.

10.4 Support for Public Key Infrastructure (PKI)

Depending on the exact encryption and digital signature algorithms chosen to implement security requirements (within WS-I Basic Security or an equivalent mechanism), the JIN will likely need to support infrastructure for the management of digital certificates and public keys. A range of options (in terms of initial implementation costs, maintenance costs, and complexity) is available; the JIN partners will need to survey the options and determine the appropriate balance of robustness on one hand, and cost and complexity on the other.

The leading candidate for PKI support on the JIN should be the PKI that the Washington Department of Information Services (DIS) has already implemented. An assessment is required to ensure that this implementation meets the JIN needs (in particular, that the implementation successfully interoperates with tools and technologies partners will use to implement web services security).

10.5 Support for WS-Reliability

The recommended implementation of reliable messaging is for web services to support the OASIS WS-Reliability 1.1 standard. The infrastructure deployed on the JIN and at each partner endpoint should therefore support and conform to this standard. Alternatively, the JIN and partner endpoint

infrastructure needs to support the reliability requirements with equivalent mechanisms.

10.6 Support for UDDI

The recommended implementation of location independence requirements (and the loose coupling required for service-oriented architecture) is for service client endpoint software to locate services using the Universal Description, Discovery, and Integration (UDDI) standard. This will include the JIN providing for and maintaining a UDDI directory server. Alternatively, the JIN and partner endpoint infrastructure needs to support location-independence with equivalent mechanisms.

10.7 Support for Message Unique Identifiers

In order to support logging and auditing requirements, and to support consistent identification of messages across JIN partners, the JIN will need to support the generation of unique identifiers for messages. A likely scenario would be for the JIN to provide a web service (whose precise interface remains to be defined) that would generate identifiers based on a set of message characteristics as well as some kind of globally and temporally unique token. Alternatively, the responsibility for generating identifiers for messages could be distributed as appropriate across the JIN partners, with each providing a web service for particular message types.

10.8 Support for logging and auditing requirements

It will be necessary (for electronic tickets in particular and JIN exchanges in general) for message transactions to be logged, so that JIN can track the status of messages sent and received over the network. The infrastructure deployed on the JIN should therefore support the logging of information about a message (i.e., the message identifier, origin, destination, date and time of delivery, delivery status, and possibly a hash of the message contents) for future reference.

10.9 Deployment View implications not documented

It should be noted that this report is not making any statement as to the implications on the Deployment View of the JIN architecture. The Deployment View deals with concerns of physical hardware, software, and network connectivity needs. The reason these important factors are not addressed here is because it is not possible to make effective recommendations until it is clear which physical messaging infrastructure is to be adopted as the JIN standard. This decision is not expected until late January, 2005.

11 Recommendations

This section of the report outlines a set of recommendations for AOC, other JIN partners, and the JIN itself. To the extent some of these recommendations are addressed more to other JIN partners or the JIN overall, rather than to AOC, the intent is to suggest that AOC encourage the other partners to adopt these recommendations.

Many of these recommendations have applicability beyond the specific E-TRIP exchanges that are the scope of this report, insofar as they are recommendations about JIN standards, architecture, and operations that are more general than E-TRIP. However, since the implementation of JIN is still in the early stages, and since E-TRIP exchanges will be among the first to be developed, successful implementation of E-TRIP will likely require higher investment in architecture than future exchanges.

11.1 Recommended Messaging Standards

This report recommends that all E-TRIP exchanges be implemented in compliance with the Web Services Interoperability Organization's (WS-I's) Basic Profile 1.1. This profile constrains the World Wide Web Consortium's (W3C's) SOAP 1.1 and WSDL 1.1 standards to achieve interoperability. Note that WS-I compliance can be achieved on all software platforms used by JIN partners (including Java/J2EE and .NET), as well as within the two messaging implementations (BizTalk and Sonic ESB) assessed during the JIN proof-of-concept exercise in 2004.

The recommendation that the JIN standardize on WS-I Basic Profile 1.1 is based on the fact that, by themselves, SOAP 1.1 and WSDL 1.1 do not guarantee interoperability. That is, it is possible for two exchange endpoints both to faithfully implement SOAP 1.1 and not be interoperable with each other. WS-I Basic Profile 1.1 makes available all of the features of SOAP 1.1 and WSDL 1.1, but in a way that guarantees interoperability across platforms and tools.

Since this report recommends that the OASIS LegalXML Electronic Court Filing "Blue" standard serve as the basis for the Ticket Filing exchange (Law Enforcement to Courts), it is also recommended that the AOC adopt a web services oriented profile within that standard.

11.2 Standards for Implementing Non-Functional Requirements

We recommend that each identified technical system requirement associated with each exchange be implemented in compliance with the following open industry standards.

(Note that these are "baseline" recommendations, in the sense that using these standards as implementations of the technical system requirements will result in interoperability and compliance with open standards. However, depending on the messaging architecture adopted by JIN in early 2005, there may be options within that architecture for implementing these requirements more efficiently or effectively. Should this be the case, then our recommendation would be to utilize whatever the most effective implementation option happens to be. Nonetheless, we recommend that the JIN verify the ability of the adopted messaging architecture to implement these requirements completely.)

Requirement	Standard(s)
Message Non-Repudiation	WS-I Basic Security Profile 1.0 (XML Signature)
Message Integrity	WS-I Basic Security Profile 1.0 (XML Signature)
Message Confidentiality	WS-I Basic Security Profile 1.0 (XML Encryption)
Message Reliability	WS-Reliability 1.1
Message Authentication	WS-I Basic Security Profile 1.0 with WS-Security 1.0 and WS-Security 1.0 SAML Profile
Location Independence	Universal Description, Discovery, and Integration

Implementation of message non-repudiation will require more than what is available from WS-I Basic Security Profile 1.0, using XML Signature. XML

Signature provides a standard XML vocabulary for encoding signature information in a message. However, it does not provide a persistence mechanism for keeping records of messages successfully transmitted and received. If the intent is to make the JIN responsible for successful delivery of messages (or notification of failure), then JIN will require a mechanism to retrieve an artifact from storage to prove incontrovertibly that the message was successfully transmitted. This message storage mechanism should be designed as a service on the JIN (which service is owned and maintained by JIN). It is a recommendation of this report that this service store:

- A hash of the message contents, consisting of a digital signature of the message computed with a private key owned and controlled by the JIN Board or Director
- Sender information (detailed requirements needed)
- Recipient information (detailed requirements needed)
- Date and time of delivery

11.3 Approach to Other Non-Functional Requirements

The following technical system requirements were identified in our research, and need to be implemented on the JIN and available to several exchanges. However, there are no clear industry standards that satisfy these requirements. This report recommends that JIN verify that the adopted messaging architecture completely implements these requirements.

11.3.1 Message Retransmission

The identified need to be able to retransmit batches of messages in a particular exchange from a specified time period could be implemented by a service on the JIN (owned and maintained by JIN) that is routed every JIN message and maintains a copy of same in some form of persistent storage. This service would offer an interface that allows a message recipient to request retransmission of a set of messages by specifying the kind of message and the boundaries of the time period.

Presumably, messages would be stored for a limited period of time, after which they would no longer be available for retransmission.

It is a recommendation of this report that the JIN choose not to implement this requirement, for the following reasons:

- There does not seem to be significant advantage to implementing this requirement in a centralized fashion
- If this requirement mitigates significant risk for particular partners in particular exchanges, specific partner-owned solutions could be constructed to implement the requirement
- Implementing this in a centralized fashion would require the JIN to acquire appropriate hardware resources for persisting messages, as well as to devote resources to implementation of the service itself

If the recommendation not to implement this requirement is rejected, then a secondary recommendation would be to design and implement a message persistence service on the JIN, owned and maintained by the JIN. The first step in this would be to document clear requirements for the service interface and required behavior.

11.3.2 Message Uniqueness

As noted above, it is a requirement of some E-TRIP exchanges that messages of a particular type be globally and temporally unique. That is, each message will contain some mechanism for unique identification across JIN partners and for all time.

Note that while this report recommends usage of the WS-Reliability standard for guaranteed one-time delivery of messages, and although WS-Reliability mandates inclusion of a unique Message Identifier with each message, this Message Identifier is insufficient to implement the requirement.

11.3.3 Logging and Auditing

It is a recommendation of this report that logging and auditing requirements be implemented in conjunction with implementation of JIN's requirement to prove successful delivery of messages. As noted above (section 11.2), additional detailed requirements discovery is needed to determine exactly what information is to be retained about each message.

11.3.4 Document Retention

As noted above, it is a requirement of some E-TRIP exchanges that message recipients retain information in compliance with State Auditor and other requirements. Since this requirement does not impact interoperability, it is recommended that this requirement remain out of scope for all JIN exchanges. JIN partners who receive messages and are required to retain the information will need to implement this as a feature of the associated endpoint services.

11.4 Establish Comprehensive JIN Architecture

It is a widely-accepted best practice of software development that software projects (including integration efforts) be supported by a comprehensive technical architecture. A technical architecture can improve reuse (and reduce rework) by establishing detailed technical standards for implementation of exchanges. An architecture provides for the controlled, managed delivery of business value through technology, while carefully identifying and mitigating critical risks. An architecture is a living entity that grows as requirements and technology change, and so requires active revision and management.

It is a recommendation of this report that JIN adopt this best practice by establishing a technical architecture for JIN before October, 2005. This report includes provisions for development of the architecture in Section 9.3.

It is further suggested that the establishment of a technical architecture for JIN and a mechanism for maturing the architecture over time are the most

important measures the JIN can adopt in pursuit of the “Reusable Components” JIN technology principle.

Clearly, the technical architecture should recognize and incorporate the contributions made to de-facto JIN architecture by ongoing exchange projects. In particular, the architecture should reflect lessons-learned and decisions made in the construction of E-TRIP exchanges recommended in this report, as well as in the construction of the consolidated criminal history query application ongoing in early 2005. However, it is important to recognize that a technical architecture for the JIN goes well beyond the identification, procurement, and deployment of a common messaging infrastructure.

The JIN technical architecture should address the following areas:

- A formal adoption of dependent standards (some of which are recommended in this report) and the relationships between them
- Standards for the logical and physical design of JIN services, and a mechanism for managing design artifacts
- A comprehensive configuration management strategy
- A comprehensive change management strategy
- A comprehensive quality assurance and conformance assessment strategy, including support for parallel endpoint development
- A deployment view that identifies the physical topology of the JIN and configuration of the messaging infrastructure
- A requirements view that documents supported non-functional requirements (some of which are recommended in this report) and use cases that describe each exchange; this view should leverage the SEARCH Justice Information Exchange Model (JIEM) Reference Model as much as possible to identify baseline exchange requirements

The architecture should be formally described and published by some means that makes it publicly and readily accessible to all JIN stakeholders.

This recommendation should not be interpreted as suggesting that JIN partners work towards commonality in their internal technical architectures. To the contrary, the JIN technical architecture should recognize the architectural autonomy of the JIN partners, and should insulate one partner from any impacts of changes to other partners' internal architectures.

11.5 Implement architectural governance and standards compliance strategies

Some of the other recommendations in this section suggest a strong role for the JIN partners, through the JIN itself, with respect to the establishment of exchange standards and architecture for integrated justice in Washington. For the standards and architecture to be meaningful, this report recommends that the JIN evolve a mechanism for assessing the compliance of individual exchange implementations. Perhaps the simplest way to do this is for the JIN Program Office, JIN TAG, and (where appropriate) the JIN Board to be actively involved in approving projects' achievement of phase milestones (as discussed above in section 9.3). Part of transitioning from phase to phase is explicit acknowledgement by these bodies that the exchange development project is adhering to standards and architecture (or, when necessary, evolving the standards and architecture in a managed way.)

In particular, this report recommends that for E-TRIP exchanges (and JIN exchanges in general) the JIN Program Office (on behalf of and under the direction of the JIN TAG and JIN Board):

- Approve the Web Services Description Language (WSDL) and GJXDM-conformant XML Schemas for each exchange that uses JIN infrastructure or is funded by JIN, and maintain the WSDL and schemas over time
- Approve strategies for implementation of non-functional requirements in the JIN infrastructure
- Require the creation of service endpoint stubs and exchange acceptance test suites based on them; require that implementations pass their acceptance tests at the end of the construction phase

11.6 Support of JIN Program Office

This report (in particular, the set of recommendations in this section) identifies the need for the active establishment and maintenance of JIN technical architecture and standards. Experience in the industry has shown that a viable technical architecture usually does not emerge by accident, especially in an environment characterized by autonomous partners attempting to integrate disparate information systems.

Other recommendations in this section identify a role for the JIN Program Office as a "Center of Excellence", promoting best practices and housing technology expertise for the benefit of the JIN partners. In this role, the JIN Program Office can coordinate mentoring, training, and technical assistance for individual exchange development projects. Also in this role, the JIN Program Office can serve as a focal point for the state justice community in its monitoring of and contribution to standards efforts ongoing in the larger national justice community.

It is a recommendation of this report that the JIN Program Office continue to lead and coordinate the evolution of a technical architecture and set of standards for JIN. In support of this goal, it is further recommended that the JIN be provided with adequate funding and support from the JIN partners and state government overall, so that it may develop a Center of Excellence for JIN.

11.7 Acquire skills in JIN standard technologies

Successful implementation of E-TRIP exchanges (and future exchanges in other areas) will require that the JIN partners secure the services of implementation teams that have appropriate experience and expertise in the technologies adopted by the JIN. Acquiring teams with the necessary skills will likely happen in two ways.

One approach is for the JIN (and/or JIN partners) to hire contracted teams (external to state agencies) to implement specific exchanges. It is a recommendation of this report that when doing so, JIN partner agencies (and the JIN itself) require contracted teams to have:

- Experience in exchange document schema development using GJXDM
- Experience in the design and development of web services using established JIN standard technologies
- Experience designing and documenting service-oriented architectures
- Familiarity with opportunities for reuse from the national justice community (e.g., the SEARCH JIEM Reference Model, reference document development efforts, etc.)

Note that this experience should be required in addition to expertise with the particular technologies required to implement a specific exchange (e.g., a partner's internal development technologies.)

Another approach is for the JIN (and/or JIN partners) to develop and leverage the skills of state agency staff. Most partners have at least some staff familiarity with proposed JIN standard technologies. It is a recommendation of this report that partner agencies foster staff skills development in these areas by pursuing activities such as:

- Sending appropriate staff to training events sponsored by the national justice community (especially GJXDM Developer Workshops and the planned 2005 GJXDM Users Conference)
- Utilizing focused, on-site training and technical assistance (TA) resources (e.g., requesting Federally-sponsored TA site visits from national justice organizations like the Integrated Justice Information Systems (IJIS) Institute, SEARCH, and NLETS)
- Including staff mentoring provisions in all implementation contracts with vendors
- Training staff on JIN standard technologies, especially XML, XML Schema, and Web Services (WS-I, SOAP, WSDL)

- Establish the JIN Program Office as a Center of Excellence in JIN standard technologies as well as national justice standards, so that the Program Office can provide technical assistance and mentoring services for partner agencies

11.8 Leverage National Justice Community Reference Material and Standards

The development of initial E-TRIP exchanges (and other JIN exchanges as well) are occurring at an opportune time. In the past year (and to some extent before that), the national justice community has made significant progress in developing justice community standards and reference material that can be leveraged as a basis for state and local justice integration efforts. Not all of these standards and reference materials have reached a final, approved status, but nonetheless they generally are stable enough to be reused, at least as a source of requirements for exchange message contents.

These standards and materials generally complement and extend GJXDM, by extracting components from the GJXDM reference schema and building schemas to define actual message structures. That is, these standards are not to be used instead of GJXDM, but rather in conjunction with GJXDM. In areas where the standards do not meet JIN and E-TRIP needs, the reference schemas should be extended where possible by utilizing structures within GJXDM.

In cases where GJXDM needs to be extended, the traffic records community (and JIN) should seek out existing (or emerging) XML vocabularies to address these extensions. In particular, it is anticipated that significant extensions will be required to implement collision reports. GJXDM does not currently contain elements and types to cover many of the data structures inherent in collision reports. However, at least two existing or emerging vocabularies have been identified that do cover some of this information. The Automated Crash Notification (ACN) standard, under development by the ComCARE Alliance, includes XML DTDs for reporting crash incident information by telematic device (like OnStar). While ACN does not include all information

required for accident reporting, it certainly could provide a useful starting point. Also, the emerging TransXML standard Safety Schema will include data structures for collision reporting. This standard is based on the Model Minimum Uniform Crash Criteria (MMUCC), ANSI D-16, ANSI D-20, and Fatal Accident Reporting System (FARS) standards. The TransXML web site, as of the release date of this report, indicates that the Safety Schema will be available in July, 2005.

It is a recommendation of this report that, in implementing collision reporting exchanges, the E-TRIP participants utilize ACN and TransXML as much as possible. If exchange development proceeds before TransXML in particular is released, then this report recommends that the E-TRIP participants develop custom schemas, in a Washington E-TRIP collision reporting namespace, that are follow terms and definitions from MMUCC, ANSI-D16, ANSI-D20, and FARS as closely as possible. Once TransXML is released, the E-TRIP participants should plan on migrating the Washington-specific schemas to TransXML as soon as possible.

It is a recommendation of this report that the JIN participants be familiar enough with these standards (especially GJXDM) and references to ensure maximum component reuse. In addition, it is recommended that GJXDM reference exchange document schemas be used as the basis for the schemas that define JIN exchanges, and that wherever possible these reference schemas be incorporated directly into JIN exchanges (i.e., by reference rather than by copying them and modifying them).

In particular, E-TRIP exchange (and general JIN exchange) development projects should seek to reuse, wherever appropriate:

- The Citation and Disposition reference documents constructed by the National Center for State Courts
- The Arrest, Booking, Incident Report, and Field Investigation Report reference documents constructed by the Community-Oriented Policing Services (COPS) Office and SEARCH

- For the Ticket Filing exchange between Law Enforcement and Courts, the OASIS LegalXML Electronic Court Filing "Blue" standard
- Policy and strategic guidance from the Global Justice Information Sharing Initiative's ("Global") Infrastructure/Standards Working Group (ISWG), in particular the current ISWG focus on service-oriented architecture
- The SEARCH Justice Information Exchange Model (JIEM) tool (as a mechanism for documenting exchange requirements in detail)
- The SEARCH Justice Information Exchange Model (JIEM) reference model (as a mechanism for identifying common national exchanges)

11.9 Continue efforts to make partner systems available to the JIN as services

In accordance with JIN technology principles (in particular the "interoperability" and "applications and data exchanges" principles), JIN partners should be actively enabling legacy systems and designing new systems to be interoperable via JIN standards. This report echoes the recommendations embodied in these principles.

Specifically with respect to E-TRIP exchanges:

- In the short term, the Administrative Office of the Courts should plan on integrating the DISCIS system via screen-scraping adapters (for service access into DISCIS), and via Java or DB2 procedures out of Natural (for service access out of DISCIS). As part of the elaboration phase detailed in Section 9.3.3 above, AOC should conduct a proof-of-concept exercise to test these recommendations and determine the best approach to DISCIS integration.
- To support screen-scraping integration with DISCIS in the short-run, AOC should procure and implement the most recent version of IBM's Host-On-Demand product, and should implement a plan to maintain sufficient Host-On-Demand licenses for the remainder of DISCIS' active life

- In the long term, AOC should continue migrating its mainframe-based legacy systems to the Java 2 Enterprise Edition (J2EE) platform, which offers more robust web services capabilities.
- In procuring records management systems (RMSes), law enforcement agencies in Washington should require (or at least give strong preference to) vendors and products that expose appropriate data and business processes as web services, and that in doing so structure information exchanges according to justice community standards like GJXDM. Agencies should indicate a preference for products based on platforms (like Java/J2EE and .NET) that natively support web services technologies.
- The Department of Transportation should investigate migration of the current collision information tracking system from Visual Basic 6 to the .NET platform, which offers more robust web services capabilities than legacy Microsoft technologies.
- As part of its ongoing .NET "replatforming" effort, the Department of Licensing should continue making progress in exposing COBOL transactions as services. In addition, as part of the elaboration phase detailed in Section 9.3.3 above, DOL should conduct a proof-of-concept exercise to make sure that the exposed services are compliant with the web services standards recommended in this report.

It is recommended that all JIN partners design new systems (or re-design/migrate legacy systems) around a service-oriented architecture. Most importantly, in systems design, transactions should be designed and implemented separately from graphical user interfaces (GUIs) used by humans to interact with the systems. Separating business logic from user interface is the most important technique to promote system integrability (via services) and interoperability. When implementing independent service layers in their architectures, partners should make sure that services are adequately tested independently of the user interface as well.

As the traffic records partner agencies pursue field support for electronic tickets, an important criterion in the selection (or construction) of a solution should be the degree to which the solution supports integration in a service-

oriented architecture. (The solution itself need not be service-oriented or based on web services, assuming the transmission of ticket data is between the field device and a local or state law enforcement ticket repository/database. However, if the chosen solution involves the field device acting as an exchange endpoint, then that device will need to meet all of the identified requirements for that endpoint. In any case, the chosen solution needs to be consistent with the JIN standards, insofar as it should not preclude the partners from constructing standards-conformant exchanges.)

11.10 Consolidate current Courts-DOL disposition reporting exchanges

Currently, Seattle Municipal Court maintains a periodic transfer of adjudicated tickets to the Department of Licensing. DOL in turn has built a batch process that receives each transfer and queues tickets for processing by staff at DOL, with the ultimate objective of updating driver history.

Once DOL implements a web service to receive adjudicated tickets from other courts (via AOC), it will be disadvantageous for DOL to maintain a separate batch process for receiving dispositions from Seattle Municipal Court. The additional costs of a parallel process will increase significantly as DOL focuses its .NET migration project on re-development of key enterprise components, insofar as re-development touches components required to support the batch process.

Consequently, it is recommended that as soon as possible adjudicated tickets from Seattle Municipal Court be reported via the new E-TRIP exchange, and that at the same time the current batch transfer be terminated. As a general rule, each business process exposed by each JIN partner should have one and only one entry point.

11.11 Assess suitability of DIS PKI for web services security

As discussed in section 10.4 above, support for the recommended standard web services security technologies will require public key infrastructure (PKI). Since DIS has already built a PKI as part of the Fortress security solution for state government, this infrastructure should be used if it meets the JIN's needs.

This report recommends that JIN and DIS coordinate an assessment to ensure that the existing PKI established by DIS will adequately support the identified standard web services security technologies, as well as tools likely to be used by JIN partners to implement web services security.

11.12 Favor open standards over proprietary solutions

In section 11.2 above, this report recommends that a series of open industry standards in the web services space be used to implement identified non-functional requirements. However, that section also suggests that the messaging infrastructure platform chosen by the JIN may have proprietary mechanisms for implementing those same requirements, and that these mechanisms may be simpler or less costly to put in place, at least in the short run.

This report strongly encourages the JIN to favor the adoption of open standards, even when some short-term gains could be realized from choosing a vendor's proprietary path.

11.13 Continue current efforts to identify a field entry device for electronic tickets

This report has focused primarily on the message exchanges between partners to support E-TRIP. In particular, with respect to the issuing and filing of tickets, this report has focused on the filing of cases by law enforcement to the courts. This report has not focused on requirements,

analysis and recommendations associated with the implementation of field entry support for tickets.

Nonetheless, this report recognizes that a solution to this problem will be an important component of the overall approach to electronic tickets and traffic records. Consequently, it is recommended that the JIN partners and traffic records agencies continue to pursue aggressively a solution for electronic entry and issuance of tickets by officers in the field.

As recommended elsewhere in this section, it is important that any field entry/issuance device be consistent with the rest of the chosen JIN architecture and the messaging standards recommended here. It should be noted that the TraCS solution previously piloted by the Courts and Washington State Patrol currently is based upon an architecture that is mostly inconsistent with the envisioned JIN architecture and messaging standards. It would certainly be possible to modify this architecture (or façade it somehow) to improve the consistency, but whether this would be cost-effective or not should be an area of investigation subsequent to this report.

11.14 Develop a strategy around service level agreements

One of the key components needed to define the governance structure for cross departmental data exchanges is the concept of Service Level Management. The objective of the Service Level Management process should be to manage and maintain the quality of integration services delivered to E-TRIP Stakeholders. The process also seeks to improve on the quality of service delivered to stakeholders by measuring and reviewing the level of performance delivered and achieved by the E-TRIP participants.

This is achieved through a continuous cycle of agreeing to, monitoring and reporting of E-TRIP service level performance.

Service Level Management is one of the most important processes of IT Service Management. It receives input from the Service Support processes

(incident, problem, change management) and provides information used by all Service Delivery processes.

Agreements defined by Service Level Management

As the E-TRIP program evolves, the E-TRIP steering committee should consider entering into three types of agreements with its stakeholders:

Service Level Agreements (SLAs) – agreements between the originating and responding partner in each exchange, concerning the level of service provision delivered by each partner.

Operational Level Agreements (OLAs) – agreements made between internal IT departments of the partner (e.g., Network Management, IT Operations & JIN)

Underpinning Contracts (UCs) – contracts between exchange partners and an external supplier (e.g. DIS).

A close relationship exists among these three agreements, as Service Level Agreements must be supported by their associated OLAs and UCs. This ensures that service levels committed to in OLAs and UCs enable the service levels within the Service Level Agreements they support.

Benefits of implementing Service Level Management

Implementing the Service Level Management process enables both of the exchange partners to have a clear understanding of the expected level of delivered services and their associated costs for the organization, by documenting these goals into formal agreements. It also assists the Steering Committee with managing external supplier relationships, and introduces the possibility of negotiating improved services and/or reduced costs.

We recommend that all participants begin discussions with their respective Exchange Partners as soon as possible to begin developing this governance structure.

11.15 Adopt software development best practices on exchange projects

It is important to note that creation of JIN exchanges should be treated as software development projects, since they are coordinated efforts to build data exchanges between partners. Consequently, it is a recommendation of this report that JIN adopt a core set of software development best practices to govern its approach to exchange development projects. These best practices are well-documented in the software engineering literature, and include:

- Following an iterative and incremental approach to project planning
- Driving projects from requirements, by explicitly building a written requirements model that includes functional and non-functional requirements (following the model of this report's approach, or something similar)
- Establishing and maturing a technical architecture across projects, as recommended elsewhere in this section; requiring that individual exchanges conform to the architecture (including standards)
- Putting in place effective risk-mitigation strategies, like configuration management, change management, and managed quality assurance, as recommended elsewhere in this report
- Viewing testing as an integral part of the development of exchanges, and performing testing of components as they are developed, not at the end of a project
- Releasing functionality (exchanges) in the smallest and most frequent increments possible, to tighten the feedback loop between projects and stakeholder benefit
- Each released increment delivers real business value to the JIN partners, their constituents/customers, or the public; no increment should contain just new infrastructure

- Establishing effective communication mechanisms so all JIN stakeholders (partner executives, managers, and staff; developers; contractors; legislators; local governments; funding authorities) can easily consume the information they need to assess progress on projects

In addition, in order to strengthen communication and mitigate risk, it is a recommendation of this report that E-TRIP exchange construction projects (and all JIN exchange construction projects) be managed by a formal, consistent project governance structure, as follows.

JIN exchange projects should be initiated by the formation of a project management team. This team should consist of technical leads and project managers from each involved partner, a JIN project manager (or the JIN Program Office Director), and a technical expert (appointed by the JIN Program Office Director) representing the interests of the JIN technical architecture. In addition, if the project is funded by or through an organization other than the JIN Program Office (for example, the Office of Financial Management), then a representative from that organization should also be included on the team.

The role of this project management team would be:

- To meet daily (for a brief period, usually 15 minutes) to report progress and raise risks/impediments in the way of progress. While daily meetings may seem excessive, industry experience shows that frequent but brief check-ins by project operational staff constitute an effective risk-mitigation strategy, since one of the chief causes of software project failure is inadequate communication. The daily meeting can take place in person if practicable, or otherwise by teleconference; it should be facilitated by a project manager or technical lead with experience in leading daily stand-up meetings.
- To resolve project scope issues by approving or disapproving functional requirements for inclusion in the scope of the project. If the project management team is unable to agree on functional scope

changes that remain within budget, then issues should be accelerated to the appropriate business governance body (e.g., a steering committee, the JIN TAG, or the JIN Board.)

- To resolve architectural and standards compliance issues. When such issues arise, the team has two options: either agree to change project approach to align with current architecture/standards, or agree to alter the architecture/standards to permit the project approach. The second option requires ratification by the JIN TAG.
- To report on project status weekly in writing to the JIN TAG and Board members, and in person to the JIN TAG and Board members at the next meeting of those bodies immediately following the production implementation of project work-product (exchanges)

Note that this concept of a project management team differs somewhat from the traditional concept of a "steering committee." A steering committee is usually given the responsibility for chartering a project and making functional scope decisions when the impact of those decisions may be to exceed the project budget. The vision for the project management team is for it to be involved daily in the detailed operations of the project, making decisions that would generally be viewed as too fine-grained for a traditional steering committee to deal with.

The team should operate on a consensus basis. Regarding standards and architectural conformance issues, the JIN Program Office Director and technical expert reserve the right to veto the judgment of the project management team, which veto can be appealed to the JIN TAG.

11.16 Promote the continued aggressive development of the OASIS E-Filing standard

This report has recommended that the Ticket Filing exchange (between Law Enforcement and Courts) be based on the emerging OASIS LegalXML Electronic Court Filing "Blue" standard. It is important to note that while the requirements on which this standard is based have reached a mature enough

state to support this recommendation, the standard itself has not been finalized by the OASIS technical committee.

The support of the Washington AOC has been instrumental in the development of the standard to this point. It is a recommendation of this report that the AOC continue to promote the development of the standard, and to influence the standard (to the extent possible) in a manner consistent with the needs of E-TRIP specifically and JIN in general.

Further, it is recommended that AOC continue to plan aggressively for the implementation of electronic filing infrastructure for Washington Courts that is conformant with the standard.